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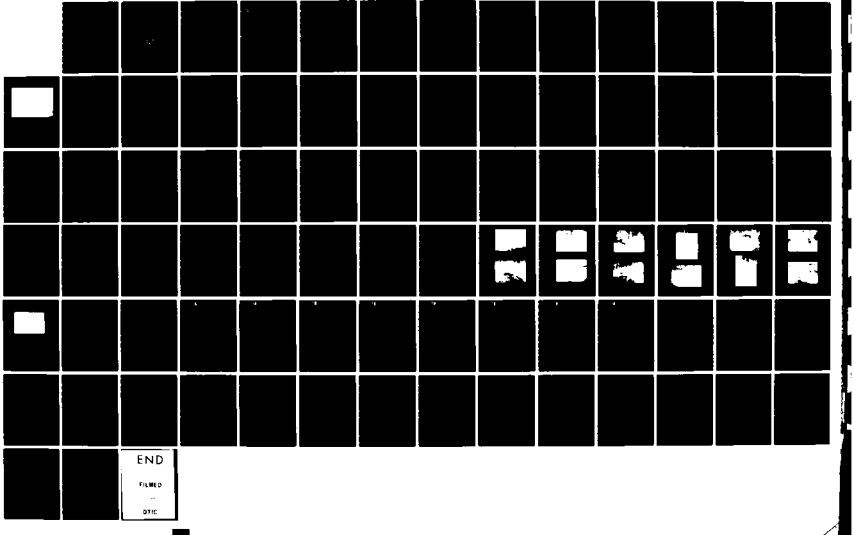

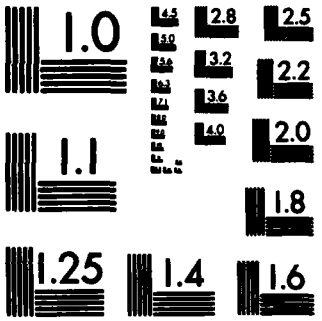

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LOWER CONNECTICUT RIVER BASIN
DEEP RIVER , CONNECTICUT

BUSHY HILL POND DAM
CT 00426

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEER
WALTHAM , MASS. 02154

APRIL 1980

UNCLASSIFIED

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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

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Lower Connecticut River Basin
Deep River, Connecticut

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Bushy Hill Pond Dam is an earth embankment structure 265 feet in length with a maximum height of 29 feet. A stone masonry spillway 20 feet in length is located at the right abutment of the dam. Bushy Hill Pond has a storage of 616 acre-feet; the size classification is thus "small". The dam is classified as having a "high" hazard potential. Based on the visual inspection, the Bushy Hill Pond Dam and its appurtenances are judged to be in poor condition. For the combination of dam size (small) and downstream hazard (high), a range in the magnitude of the test flood of ½ PMF to PMF is given.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDED-E

16 OCT 1980

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the Bushy Hill Pond Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. The report is based upon a visual inspection, a review of past performance, and a preliminary hydrological analysis. A brief assessment is included at the beginning of the report.

The preliminary hydrologic analysis has indicated that the spillway capacity for the Bushy Hill Pond Dam would likely be exceeded by floods greater than 9% percent of the Probable Maximum Flood (PMF), the test flood for spillway adequacy. Our screening criteria specifies that a dam of this class which does not have sufficient spillway capacity to discharge fifty percent of the PMF, should be adjudged as having a seriously inadequate spillway and the dam assessed as unsafe, non-emergency, until more detailed studies prove otherwise or corrective measures are completed.

The term "unsafe" applied to a dam because of an inadequate spillway does not indicate the same degree of emergency as that term would if applied because of structural deficiency. It does indicate, however, that a severe storm may cause overtopping and possible failure of the dam, with significant damage and potential loss of life downstream.

It is recommended that within twelve months from the date of this report the owner of the dam engage the services of a professional or consulting engineer to determine by more sophisticated methods and procedures the magnitude of the spillway deficiency. Based on this determination, appropriate remedial mitigating measures should be designed and completed within 24 months of this date of notification. In the interim a detailed emergency operation plan and warning system should be promptly developed. During periods of unusually heavy precipitation, round-the-clock surveillance should be provided.

NEDED-E
Honorable Ella T. Grasso

I have approved the report and support the findings and recommendations described in Section 7, with qualifications as noted above. I request that you keep me informed of the actions taken to implement these recommendations since this follow-up is an important part of the non-Federal Dam Inspection Program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. This report has also been furnished to the owner of the project, Pratt Read and Company, Ivoryton Div., Ivoryton, CT.

Copies of this report will be made available to the public, upon request to this office, under the Freedom of Information Act, thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for the cooperation extended in carrying out this program.

Sincerely,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

BUSHY HILL POND DAM

CT 00426

LOWER CONNECTICUT RIVER BASIN

DEEP RIVER, CONNECTICUT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No.:	CT 00426
Name of Dam:	Bushy Hill Pond Dam
Town:	Deep River
County and State:	Middlesex, Connecticut
Stream:	Tributary to Falls River
Date of Inspection:	31 October, 1979

BRIEF ASSESSMENT

Bushy Hill Pond Dam is an earth embankment structure 265 feet in length with a maximum height of 29 feet. A stone masonry spillway 20 feet in length is located at the right abutment of the dam. The upstream face of the dam is a vertical concrete wall. The dam crest and downstream embankment are grassed. The spillway is located at the right abutment and is 20 feet in length. A 12 inch blow-off pipe provides a low level outlet.

Presently the pond serves as a fishing and recreation area for the E-X Sportsman Club. Bushy Hill Pond has a storage of 616 acre-feet; the size classification is thus "small." The dam is classified as having a "high" hazard potential. The areas of probable dam failure impact include approximately 30 inhabitable structures located along Main Street in the village of Ivoryton. The loss of life potential would be more than a few. Included are several commercial establishments within the village of Ivoryton and the Pratt Read Company. Economic loss would be extensive to the village of Ivoryton.

Based on the visual inspection, the Bushy Hill Pond Dam and its appurtenances are judged to be in poor condition. The crest of the dam appears to dip toward the upstream face. The vertical alignment is good. The face appears to bow slightly upstream and the concrete wall is cracked at many locations. The downstream slope is uneven and erosion has occurred along the toe. Large boulders were observed at the intersection of dam and spillway training wall on the left side of the spillway. Seepage was noted along the toe of the downstream slope. The stone masonry overflow spillway section has open joints; however, no movement or seepage was observed. The spillway discharge channel is in generally good condition. Some sloughing of the channel embankment (right side) was noted about 20 feet below the spillway. A 12-inch diameter low level blow-off was operated during the site visit.

For the combination of dam size (small) and downstream hazard (high), a range in the magnitude of the test flood of ½ PMF to PMF is given. A test flood of the PMF was selected for this project. The test flood inflow is 1720 CFS and the test flood outflow is 1560 CFS. The capacity of the spillway is inadequate to pass the PMF test flood without overtopping the dam. The test flood would overtop the dam by 1.4 feet. The spillway capacity without overtopping is 140 CFS which is about 9 percent of the test flood outflow.

Within one year of receipt of this Phase I Inspection Report, the owner should retain a qualified registered engineer to accomplish the following: 1) The seepage and wet areas downstream of the dam should be investigated and seepage control systems designed and constructed, as required. 2) The settlement and inward tilt of the upstream face of the dam should be investigated and repairs and restoration measures should be designed and constructed. 3) The trees and tree stumps with their roots located within 30 feet of the downstream toe of the dam should be removed, and the root zone should be backfilled with carefully selected soil, placed as directed by the engineer. In addition, the 10-in.-deep hole at the toe of the dam should be investigated and properly backfilled. 4) Conduct more refined hydrologic and hydraulic analysis to determine the need for and methods of increasing the project discharge capacity. The adequacy of the spillway channel to carry the discharge should also be investigated. The owner should carry out the recommendations made by the engineer.

The owner should also carry out the following operational and maintenance procedures: 1) Clear brush and trees from a zone 25 feet wide on each side of the spillway channel for its full length (a distance of 150 feet). 2) Remove brush located on downstream slope and within 30 feet of the downstream toe of the dam. 3) Establish a program to monitor the wet areas at the toe and downstream of the dam. A substantial increase or decrease in flow in a short period of time, unrelated to reservoir level, could indicate a potential problem. 4) Institute a program of annual technical inspection of the dam and its appurtenances by a qualified registered engineer. 5) Backfill the animal burrows on the crest and on the downstream slope of the dam. 6) Remove the boulders from the contact of the embankment with the spillway channel and 7) Establish a surveillance program for use during and immediately after heavy rainfall, and also a warning program to follow in case of emergency conditions.

S. Giavara, P.E.
President

Registered CT. 7634

This Phase I Inspection Report on Bushy Hill Pond Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

RICHARD DIBUONO, MEMBER
Water Control Branch
Engineering Division

ARAMAST MAHTESIAN, CHAIRMAN
Geotechnical Engineering Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation: however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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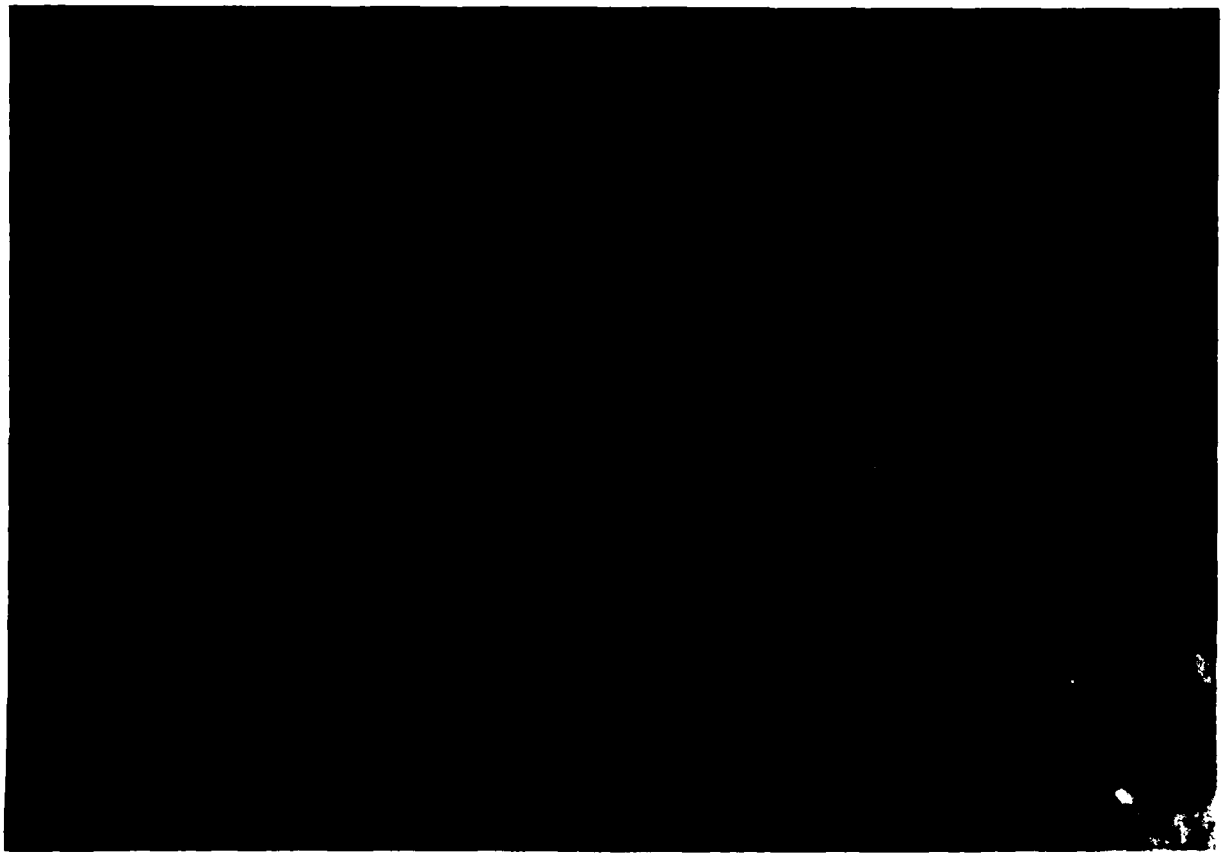
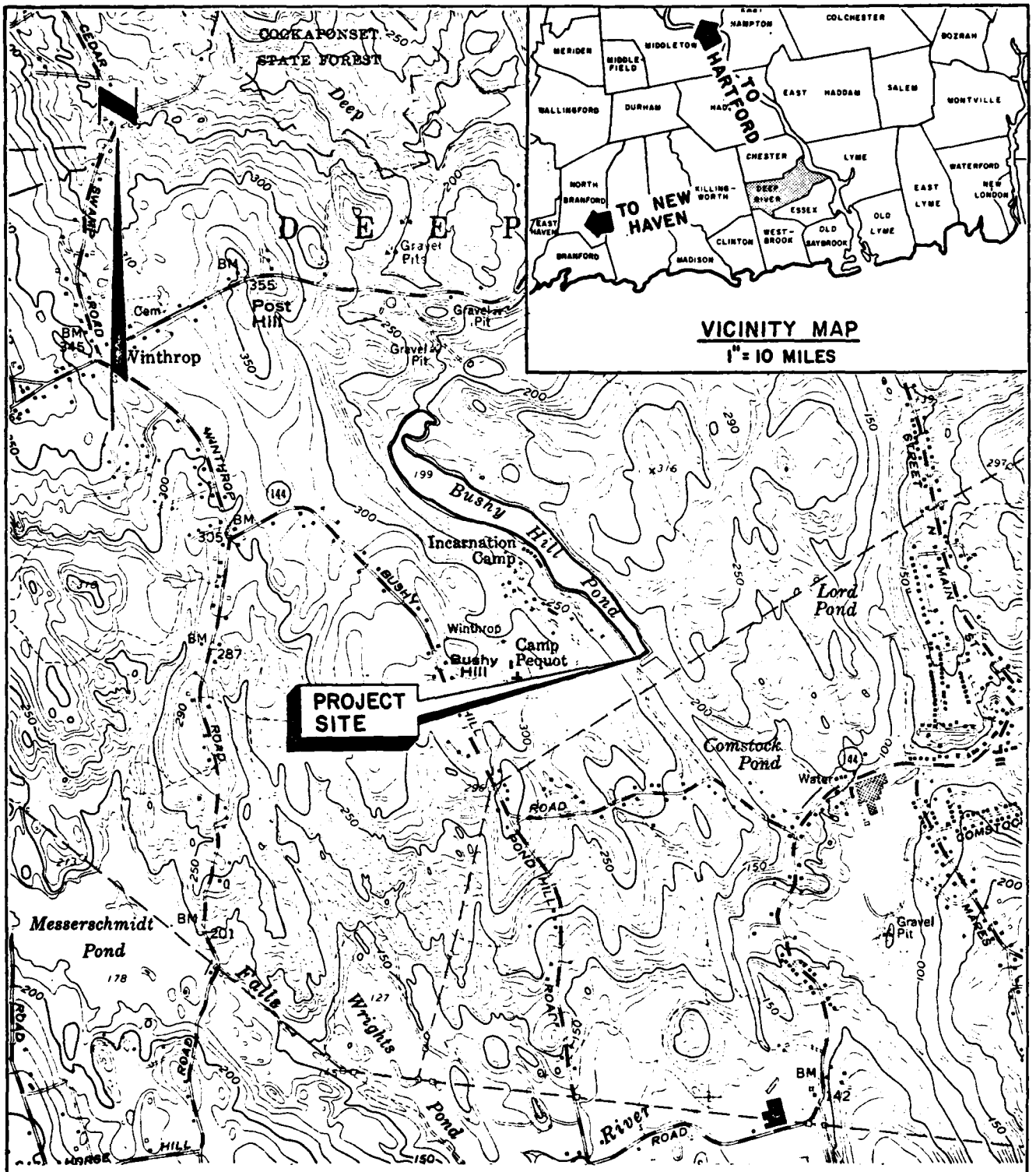


OVERVIEW PHOTO
Bushy Hill Pond Dam



VICINITY MAP
1" = 10 MILES

SCALE IN FEET
2000 1000 0 2000

BUSHY HILL POND DAM
LOCATION MAP
DEEP RIVER, CONNECTICUT

FLAHERTY • GIAVARA ASSOCIATES, P.C.

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
BUSHY HILL POND DAM - CT 00426

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL:

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection through the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Flaherty Giavara Associates, P.C. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to Flaherty Giavara Associates, P.C. under a letter of 19 October 1979 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-80-C-0001 has been assigned by the Corps of Engineers for this work.

b. Purpose.

1) Perform technical inspection and evaluation of non-federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-federal interests.

2) Encourage and assist the States to initiate quickly effective dam safety programs for non-federal dams.

3) To update, verify and complete the National Inventory of Dams.

1.2 DESCRIPTION OF THE PROJECT:

a. Location. Bushy Hill Pond is located in Deep River, Connecticut approximately one mile southeast of the village of Winthrop and one mile northwest of the village of Ivoryton. Access to the dam is from a gravel road off Bushy Hill Road in Essex, Connecticut. The reservoir is shown on the U.S.G.S. Topographic Map "Essex, Connecticut" at a latitude of 41°21'01" and a longitude of 72°27'41. The Location Map on page vi shows the location of the dam.

b. Description of Dam and Appurtenances. Bushy Hill Pond Dam is an earth embankment structure 265 feet in length with a maximum height of 29 feet. A stone masonry spillway 20 feet in length is located at the right abutment of the dam. The upstream face of the dam is a vertical concrete wall approximately 1 foot

wide and of unknown depth. The downstream embankment slopes at 1.5-2.0 horizontal to 1 vertical. The crest elevation of the dam is 200.75 NGVD. The dam crest and downstream embankment are grassed.

The spillway is a stone masonry structure with a concrete slab on the crest. The spillway is located at the right abutment and is 20 feet in length. The approach channel is confined by a concrete wall to the left and a mortared stone masonry wall to the right. The downstream face of the spillway is a 2-foot-high stone masonry wall. The spillway discharge channel is approximately 10 feet in width with side slopes of 3-1 horizontal to 1 vertical. The channel is lined with stones ranging in diameter from 1 to 3 feet. The slope of the channel is approximately 25 percent.

The outlet works consist of a submerged valve box located off the upstream face of the dam accessible by a walkway. The outlet conduit was not visible but was reported by the owner to be 12 inches in diameter. The visible portion of the outlet works at the downstream toe consists of a 12 inch x 12 inch stone conduit. The outlet channel is stone lined.

c. Size Classification. Bushy Hill Pond has a storage volume of 616 acre-feet and a maximum height of 29 feet. A storage volume of greater than 50 acre-feet but less than 1000 acre-feet and a dam height of greater than 25 feet but less than 40 feet classifies this structure in the "small" category according to guidelines established by the Corps of Engineers.

d. Hazard Classification. The dam is classified as having a "high" hazard potential. The areas of probable impact include approximately 30 inhabitable structures located along Main Street in the village of Ivoryton. The loss of life potential would be more than a few. Included are several commercial establishments within the village of Ivoryton and the Pratt Read industry. Economic loss would be extensive to the village of Ivoryton.

e. Ownership. The dam is owned by the Pratt Read and Company, Ivoryton Division, Main Street, Ivoryton, Conn. 06442, Phone: 203-767-8282.

f. Operation. The operator of the dam is Mr. Nichols of Pratt Read and Company, Phone: 203-767-8282.

g. Purpose of Dam. Historically, Bushy Hill Pond Dam was used to regulate water flowage as required for water power for Comstock, Cheney and Co. Presently the pond serves as a fishing and recreation area for the E-X Sportsman Club.

h. Design and Construction History. There is no design or construction information available for this dam. It is surmised that it was constructed in conjunction with the Comstock,

Cheney and Co. for water power in the 19th century.

i. Normal Operation Procedure. The outlet works are normally closed; therefore, the water level is maintained principally by the spillway crest elevation. The operator did report that the outlet works are opened in anticipation of heavy rainfall.

1.3 PERTINENT DATA:

a. Drainage Area. The drainage area consists of 0.67 square miles of wooded upland terrain. The drainage area is limited to the hillsides surrounding the pond with no tributary streams or upstream impoundments.

b. Discharge at Dam Site.

1) The outlet works consist of a manually operated valve box and a conduit which passes through the dam. The conduit is reported to be 12 inches in diameter. The inlet elevation of the outlet conduit is estimated to be El. 172.0±. The discharge capacity is estimated to be 20 CFS.

2) There are no known records of past floods or flood stage heights at the dam.

3) The ungated spillway capacity at the top of dam - 139 CFS @ El. 200.75.

4) The ungated spillway capacity at the test flood elevation - 327 CFS @ El. 202.1.

5) The gated spillway capacity at normal pool elevation is not applicable at this dam.

6) The gated spillway capacity at test flood elevation is not applicable at this dam.

7) The total spillway capacity at test flood elevation - 327 CFS @ El. 202.1.

8) The total project discharge at the top of dam - 139 CFS @ El. 200.75.

9) The total project discharge at test flood elevation - 1560 CFS @ El. 202.1.

c. Elevation. (Feet above NGVD)

1) Streambed at toe of dam.....172±

2) Bottom of cut-off.....Unknown

3) Maximum tailwater.....N/A

4) Recreation pool.....N/A

5) Full flood control pool.....N/A

6) Spillway crest.....199

7) Design surcharge (Original Design).....Unknown

8) Top of dam.....200.75

9) Test flood surcharge.....202.2

d. Reservoir. (Length in feet)

1) Normal pool (Spillway crest).....5,000±

2) Flood control pool.....N/A

3) Spillway crest pool.....5,000±

4) Top of dam.....5,100±

5) Test flood pool.....5,200±

e. Storage. (acre-feet)

1) Normal pool (Spillway crest).....530

2) Flood control pool.....N/A

3) Spillway crest pool.....530

4) Top of dam.....616

5) Test flood pool.....675

f. Reservoir Surface. (acres)

1) Normal pool (Spillway crest).....41

2) Flood control pool.....N/A

3) Spillway crest.....41

4) Test flood pool.....70

5) Top of dam.....59

g. Dam.

1)	Type:	Earth embankment with stone masonry spillway
2)	Length:	265 feet
3)	Height:	29 feet
4)	Top Width:	
5)	Side Slopes:	U/S vertical; D/S 1.5-2 horizontal to 1 vertical
6)	Zoning:	Unknown
7)	Impervious Core:	Unknown
8)	Cut-off:	Unknown
9)	Grout Curtain:	Unknown

h. Diversion and Regulating Tunnel.

1)	Type:	N/A
2)	Length:	N/A
3)	Closure:	N/A
4)	Access:	N/A
5)	Regulating Facilities:	N/A

i. Spillway.

1)	Type:	Stone masonry with concrete crest slab
2)	Length of Weir:	20 feet
3)	Crest Elevation:	199.0 N.G.V.D.
4)	Gates:	None
5)	U/S Channel:	Reservoir
6)	D/S Channel:	Excavated in natural ground, stone lined, width 10', slope 25 percent

j. Regulating Outlets.

1)	Invert:	El. 172.0±(Est.)
2)	Size:	12 inch diameter (Est.)
3)	Description:	Conduit
4)	Control Mechanism:	Manually operated valve box

SECTION 2 - ENGINEERING DATA

2.1 DESIGN:

No design data is available for this dam.

2.2 CONSTRUCTION:

No information relative to the Construction of the dam is available. Information presented in this report was primarily obtained by interviews and direct field measurements of the existing dam and dike.

2.3 OPERATION DATA:

Formal operation records are not available for this dam.

2.4 EVALUATION:

a. Availability. There are no plans, specifications or computations available from the Owner or State regarding the design, construction or subsequent repairs and modifications to this dam.

b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspections, past performance and sound engineering judgment.

c. Validity. There is no reason to question the validity of the available data.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS:

a. General. Based on the visual inspection, the Bushy Hill Pond Dam and its appurtenances are judged to be in poor condition. The Bushy Hill Pond Dam is an earthen dam with a vertical concrete wall on the upstream face and a concrete spillway adjacent to the right abutment. At the time of the inspection, water was flowing over the spillway crest. The crest of the dam appears to dip toward the upstream face. The vertical alignment is good. The face appears to bow slightly upstream and the concrete wall is cracked at many locations. The downstream slope is uneven and erosion has occurred along the toe. Large boulders were observed at the intersection of dam and spillway training wall on the left side of the spillway. No riprap slope protection is visible. Seepage was noted along the toe of the downstream slope. Grass and brush are growing on the downstream slope.

The spillway is in fair condition. The stone masonry overflow section has open joints; however, no movement or seepage was observed. The spillway discharge channel is in generally good condition. Some sloughing of the channel embankment (right side) was noted about 20 feet below the spillway. A 12-inch diameter low level blow-off was operated during the site visit.

b. Dam.

1) Upstream Face - The upstream face is comprised of a 1-ft.-wide concrete wall which extends to an unknown depth below the water surface (Photo No. 1). The wall is cracked at several locations along the face and is tilted slightly toward the reservoir. One of the cracks is located at Sta 1+70. At this location the left side of the wall appears to have settled three inches relative to the right side. In addition, there is evidence of lateral bulging of the wall.

2) Crest - The crest is grassed and generally well maintained as shown in Photo No. 2. Numerous animal burrows 2 to 3 in. diameter can be seen just beneath the surface of the ground.

3) Downstream Slope - As shown in Photos No. 3, 4, and 5, the downstream slope is covered with vegetation consisting of grass and brush. Many small stumps, 2- to 3-inch-diameter, were observed on the slope. Many large boulders were evident at the contact of the downstream slope with the spillway channel (Photo No. 7).

The surface of the slope has a bulge over a 10-ft. area approximately halfway down the slope opposite Sta 2+15. Numerous small animal burrows were observed on the downstream slope.

Apparent seepage areas with standing water were observed at the downstream toe as noted in Photos No. 8 and No. 9. The area downstream of the dam contains bushes and numerous trees and is generally wet and soggy. The water contains reddish organic flocs, as noted in Photo No. 8. At Sta 2+50, a depression 18 inches by 18 inches by 10 inches deep was observed at the toe.

The existence of numerous boulders and extensive brush at the junction of the dam with the spillway channel and right abutment make it difficult to inspect this area closely.

4) Spillway - The spillway is in fair condition (Photo No. 6). The stone masonry comprising the downstream face of the dam has open joints; however, there were no signs of movement or seepage. The spillway discharge channel is a stone lined channel approximately 200 feet in length. This channel was generally in good condition (Photo No. 10). There was sloughing of the right (west) channel embankment approximately 20 feet below the spillway. This area measured approximately 5 feet in width.

c. Appurtenant Structures. The outlet works consist of a submerged valve box located off the upstream face of the dam accessible by a walkway. A conduit reported to be 12 inches in diameter passes through the dam to the toe of the downstream slope. The visible portion of the outlet works at the downstream toe consists of a 12 inch x 12 inch stone conduit. Although no portions of the outlet works through the dam were visible, it was operated satisfactorily during the inspection (Photos No. 11 and No. 12). The outlet works channel is lined with stone and is in good condition. A screen is located just downstream of the outlet works. The screens purpose is unknown.

d. Reservoir Area. The perimeter of the reservoir is moderate to steep sloping and wooded. There is no evidence of slides or slope failures. No sediment deposits were observed above the water level of the reservoir (see Photo No. 13).

e. Downstream Channel. The channel is a natural stream 10 feet in width with wooded floodplains and slopes. The bed material is silty sand and does not show signs of degradation.

f. Footbridge. The footbridge consists of a concrete beam which spans the spillway and is in good condition. The concrete pier which supports the footbridge shows evidence of erosion.

3.2 EVALUATION:

On the basis of the results of the visual inspection, Bushy Hill Pond Dam is judged to be in poor condition. The following observed features could adversely affect the long-term performance of the dam.

a. The presence of soft, wet ground and standing water at the downstream toe of the dam may be the result of seepage conditions, which, if not controlled, could lead to piping and erosion and possible failure of the dam.

b. The horizontal and vertical movement observed along the upstream concrete face indicate the presence of unknown conditions in the dam which could lead to slope failure if not corrected. The dam should be investigated to determine the cause of the observed movements.

c. The presence of heavy growth of grass and brush on the downstream slope of the embankment and at the toe makes it difficult to inspect these areas closely. The presence of tree stumps and their associated root systems could create seepage paths which could lead to internal erosion of the dam.

d. The existence of a 10-in.-deep depression at the toe of the dam at Sta 2+50 needs to be investigated.

e. Numerous animal burrows were observed and could create seepage paths which could lead to internal erosion of the dam.

SECTION 4 - OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 OPERATIONAL PROCEDURES:

a. General. The outlet structure for the dam is operable and the water level for Bushy Hill Pond can be controlled. When water is needed down stream at the Pratt Read plant, the blow-off is open and water drawn from Comstock Pond downstream. The blow-off outlet is opened in anticipation of severe storms by the owner.

b. Description of any Warning System in Effect. There is no warning system of any kind in effect at the dam. There are no formal emergency operation plans in effect for lowering the water level in anticipation of severe storms.

4.2 MAINTENANCE PROCEDURES:

a. General. Maintenance of the dam consists of the occasional cutting of brush and grass mowing as necessary along the crest of the earth embankment. The project is visited on a weekly basis by the owner.

b. Operating Facilities. There are no formal maintenance procedures followed for the operating facilities.

4.3 EVALUATION:

Regular operational maintenance for this dam and its appurtenances has not been developed or implemented. A program of regular maintenance should be implemented.

An emergency action plan should be prepared to prevent or minimize the impact of failure. This plan should list the expedient action to be taken and authorities to be contacted.

SECTION 5 - EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 GENERAL DATA:

Bushy Hill Pond Dam is an earth embankment structure with a crest length of 245 feet and a height of 29 feet. The spillway is 20 feet in length and is located at the right abutment of the dam. The spillway approach channel is directly from the reservoir and consists of stone masonry walls and a concrete bottom. The spillway consists of a stone masonry structure with a concrete slab. The spillway functions as a broad crested weir with a vertical downstream face 2 feet in height. There are 1.75 feet of available head before the dam would be overtopped. The spillway discharge channel is an excavated channel in natural ground lined with stones 2-3 feet in diameter. The channel has a slope of 25 percent and is approximately 200 feet in length connecting to the outlet works channel below the dam. The outlet works are controlled by a manually operated valve on the upstream side of the dam which activates a conduit through the dam. The conduit is reported by the owner to be 12 inches in diameter.

The watershed area is 0.67 square miles of wooded upland terrain. The watershed area is limited to the hillsides surrounding the pond with no tributary streams or upstream impoundments. The watershed is generally undeveloped with some scattered residential development along Bushy Hill Road. Future development within the watershed is anticipated to be minimal.

5.2 DESIGN DATA:

There is no design data available for this dam. In lieu of existing design information, U.S.G.S. Topographic Maps (scale 1" = 2000') were used to develop hydrologic parameters. Pertinent hydraulic design data was obtained by actual field measurements at the time of field inspection.

5.3 EXPERIENCE DATA:

There is no known experience data available for this dam.

5.4 TEST FLOOD ANALYSIS:

The Spillway Test Flood for determining the spillway adequacy is based on Corps of Engineers guidelines. The size of the dam is "small" based on a storage volume of 616 acre-feet and a height of 29 feet. The hazard classification is "high" because approximately 30 habitable structures would be subject to a water level two feet greater than the first floor elevation due to the

flood wave. COE guidelines for a "small" dam with "high" hazard gives a range for the selection of the Test Flood from ½ PMF to PMF.

The Test Flood selected for this dam is the PMF. This test flood was selected because of the relatively high number of habitable structures impacted by the flood wave and the potential for extensive economic loss.

The Test Flood (PMF) was determined using methods developed by the Soils Conservation Service as described in "Design of Small Dams" by the Bureau of Reclamation. Due to the small watershed area, two Test Floods were developed based on probable maximum precipitations for storm durations of 1 and 6 hours. Test Floods for these duration storms were computed to be 3750 CFS and 1718 CFS respectively. Triangular hydrographs were developed based on the computed Spillway Test Flood inflow rates.

The developed hydrographs were routed through the reservoir using a computer program based on stage-storage and stage-discharge data. The reservoir was assumed to be full and level with the spillway prior to the storm event. The stage-discharge input data includes the parking area west of the left abutment which is level with the crest of the dam and would be overtopped along with the dam embankment.

The flood routing for the 1 hour PMF (3750 CFS inflow) indicates that the maximum stage would be 202.2 at an outflow of 1655 CFS. This flow reduction represents a reservoir attenuation of 55 percent. For this storm duration the dam would be overtopped for approximately 2.5 hours. The maximum depth of overtopping would be approximately 1.5 feet.

The flood routing for the 6 hour PMF (1718 CFS inflow) indicates that the maximum stage would be 202.1 at an outflow of 1560 CFS. For this storm duration the dam would be overtopped for approximately 7 hours. The maximum depth of overtopping would be approximately 1.4 feet. The 6 hour PMF is therefore the critical storm due to the longer duration of dam overtopping.

The maximum spillway capacity without dam overtopping is 139 CFS. The spillway can pass 8% of the 1 hour duration test flood outflow (1655 CFS) and 9% of the 6 hour duration test flood outflow (1560 CFS).

5.5 DAM FAILURE ANALYSIS:

The downstream impact of a dam failure was analyzed using COE "Rule of Thumb Guidance for Estimating Downstream Failure Hydrographs" dated April 1979.

Based on an assumed breach width equal to 40 percent of the dam's width at mid-height, the total peak outflow due to a flood wave would be 27,815 CFS. This includes an initial base flow of 139 CFS which is the spillway outflow capacity with the water surface at the top of the dam.

The areas of probable impact consist of approximately 30 inhabitable structures located along Main Street in the village of Ivoryton. These impacted structures include several commercial establishments within the village of Ivoryton and the Pratt Read Company. The flood wave analysis indicates that these structures would be inundated with flood wave waters to a depth of greater than two (2) feet. The analysis also indicates that base flow flooding of these structures would be minimal. The depth of water in the downstream impact areas was determined to be generally less than 1 foot just before assumed dam failure and range from 2 to 10 feet just after dam failure.

Economic loss would be extensive to the village of Ivoryton, the impacted commercial and industrial establishments, and the roadways which parallel and traverse the impact area. With the possibility of the loss of more than a few lives the hazard classification is "high".

SECTION 6 - EVALUATION OF STRUCTURAL STABILITY

6.1 VISUAL OBSERVATIONS:

The visual examination of the dam indicates the following major concerns which could influence the long-term performance of the dam:

a. Horizontal and vertical movement is evident at the upstream face of the dam. This movement indicates the presence of unknown conditions which could lead to a slope failure if not corrected.

b. The presence of soft, wet ground and standing water at the downstream toe of the dam may be the result of a seepage condition, which, if not corrected, could lead to failure of the dam. The existence of a 10-in.-deep hole at the toe of the dam needs to be investigated.

6.2 DESIGN AND CONSTRUCTION DATA:

There is insufficient design and construction data to formally analyze the stability of the dam. Thus the evaluation of stability is based solely on the visual inspection.

6.3 POST-CONSTRUCTION CHANGES:

No records of post-construction changes pertinent to the stability of the dam are available. No information was available on when the upstream concrete buttresses at Sta 2+50 were constructed.

6.4 SEISMIC STABILITY:

The dam is located in Seismic Zone 1 and, in accordance with the recommended Phase I inspection guidelines, does not warrant seismic stability analysis.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT:

a. Condition. On the basis of the visual inspection, the dam is judged to be in poor condition.

The settlement and tilting of the upstream concrete wall indicate the presence of unknown conditions in the dam which could lead to a slope failure if not corrected.

The presence of soft, wet areas near the downstream toe may be the result of seepage which, if not controlled, could lead to internal erosion and failure of the dam. Large trees and their associated root systems which exist near the downstream toe could, if not removed, create seepage paths which could lead to internal erosion of the dam.

The existence of a 10-in.-deep hole at the toe of the dam should be investigated as outlined in Section 7.2 below.

The large boulders that exist at the dam contact with the spillway channel prevent an adequate inspection of this area.

b. Adequacy of Information. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on the visual inspection, past operational performance of the structure, and sound engineering judgment.

c. Urgency. The recommendations and remedial measures presented in Sections 7.2 and 7.3 should be implemented by the owner within one year of receipt of the Phase I Inspection Report.

7.2 RECOMMENDATIONS:

The following recommendations should be carried out under the direction of a qualified registered engineer:

a. The seepage and wet areas downstream of the dam should be investigated and seepage control systems designed and constructed, as required.

b. The settlement and inward tilt of the upstream face of the dam should be investigated and repairs and restoration measures should be designed and constructed.

c. The trees and tree stumps with their roots located within 30 ft. of the downstream toe of the dam should be removed, and the root zone should be backfilled with carefully selected soil, placed as directed by the engineer. In addition, the 10-in. deep hole at the toe of the dam needs to be investigated and properly backfilled.

d. Conduct more refined hydrologic and hydraulic analysis to determine the need for and methods of increasing the project discharge capacity. The adequacy of the spillway channel to carry the discharge should also be investigated.

The owner should carry out the recommendations made by the engineer.

7.3 REMEDIAL MEASURES:

a. Operation and Maintenance Procedures. The owner should:

1) Clear brush and trees from a zone 25 ft. wide on each side of the spillway channel for its full length (a distance of 150 ft.).

2) Remove brush located on the downstream slope and within 30 ft. of the downstream toe of the dam.

3) Establish a program to monitor the wet areas at the toe and downstream of the dam. A substantial increase or decrease in flow in a short period of time, unrelated to reservoir level, could indicate a potential problem.

4) Institute a program of annual technical inspection of the dam and its appurtenances by a qualified registered engineer.

5) Backfill the animal burrows on the crest and on the downstream slope of the dam.

6) Remove the boulders from the contact of the embankment with the spillway channel.

7) Establish a surveillance program for use during and immediately after heavy rainfall, and also a warning program to follow in case of emergency conditions.

7.4 ALTERNATIVES:

There are no practical alternatives to the recommendations contained in Sections 7.2 and 7.3.

APPENDIX A

INSPECTION CHECK LIST

INSPECTION CHECK LIST

PARTY ORGANIZATION

PROJECT Bushy Hill Pond Dam **DATE** 31 Nov., 1979

TIME 1330

WEATHER Clear-45°F

W.S. ELEV. ____ **U.S.** ____ **DN.S.**

PARTY:

1. R. Smith, FGA, Project Manager
2. J. MacBroom, FGA, Hydraulics/Hydrology
3. P. Burgess, FGA, Hydraulics/Hydrology
4. R. Murdock, GEI, Geotechnical
5. _____

PROJECT FEATURE	INSPECTED BY	REMARKS
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Bushy Hill Pond Dam DATE: 31 Nov., 1979

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	Upstream concrete face - earth embankment.
Crest Elevation	El. 200.75 (NGVD)
Current Pool Elevation	El. 199.0 (NGVD)
Maximum Impoundment to Date	Unknown
Surface Cracks	None.
Pavement Condition	Grass slightly worn path adjacent to bridge over spillway.
Movement or Settlement of Crest	Crest appears to dip toward the upstream face.
Lateral Movement	
Vertical Alignment	Good.
Horizontal Alignment	Face appears to bow slightly upstream.
Condition at Abutment and at Concrete Structures	Upstream face cracked in many locations. Mortar missing from granite block upstream from bridge foundation.
Indications of Movement of Structural Items on Slopes	None.
Trespassing on Slopes	
Sloughing or Erosion of Slopes or Abutments	Downstream slope uneven, erosion along toe, large rock masses at intersection of dam and spillway wingwall on left side of spillway.
Rock Slope Protection - Riprap Failures	No riprap visible.
Unusual Movement or Cracking at or near Toes	None observed.
Unusual Embankment or Downstream Seepage	Seepage observed along the toe of the dam.
Piping or Boils	None.
Foundation Drainage Features	None.
Toe Drains	None.
Instrumentation System	
Vegetation	Grass and brush along the downstream face.

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Bushy Hill Pond Dam DATE: 31 Nov., 1979

AREA EVALUATED	CONDITIONS
DIKE EMBANKMENT	
Crest Elevation	Not Applicable
Current Pool Elevation	
Maximum Impoundment to Date	
Surface Cracks	
Pavement Condition	
Movement or Settlement of Crest	
Lateral Movement	
Vertical Alignment	
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	
Indications of Movement of Structural Items on Slopes	
Trespassing on Slopes	
Sloughing or Erosion of Slopes or Abutments	
Rock Slope Protection - Riprap Failures	
Unusual Movement or Cracking at or near Toes	
Unusual Embankment or Downstream Seepage	
Piping or Boils	
Foundation Drainage Features	
Toe Drains	
Instrumentation System	
Vegetation	

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Bushy Hill Pond Dam DATE: 31 Nov., 1979

AREA EVALUATED	CONDITIONS
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Not applicable
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	
Stop Logs and Slots	

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Bushy Hill Pond Dam DATE: 31 Nov., 1979

AREA EVALUATED	CONDITIONS
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	Not Applicable
General Condition	
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System in Gate Chamber	

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Bushy Hill Pond Dam DATE: 31 Nov., 1979

AREA EVALUATED	CONDITIONS
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	Not Applicable
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Bushy Hill Pond Dam DATE: 31 Nov., 1979

AREA EVALUATED	CONDITIONS
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain Holes	None.
Channel	Natural Channel.
Loose Rock or Trees Overhanging Channel	None.
Condition of Discharge Channel	Fair, Channel meanders over the surface.

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Bushy Hill Pond Dam DATE: 31 Nov., 1979

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Underwater
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Concrete	
Rust or Staining	
Spalling	
Any Visible Reinforcing	
Any Seepage or Efflorescence	
Drain Holes	None
c. Discharge Channel	
General Condition	Fair
Loose Rock Overhanging Channel	Some rock along right side.
Trees Overhanging Channel	Along the right side of spillway.
Floor of Channel	Natural Boulders
Other Obstructions	

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Bushy Hill Pond Dam DATE: 31 Nov., 1979

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SERVICE BRIDGE	
a. Superstructure	Bridge over spillway in good condition.
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Under Side of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat and Backwall	

APPENDIX B

ENGINEERING DATA

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM Bushy Hill Pond Dam

I.D. NO. CT 00426

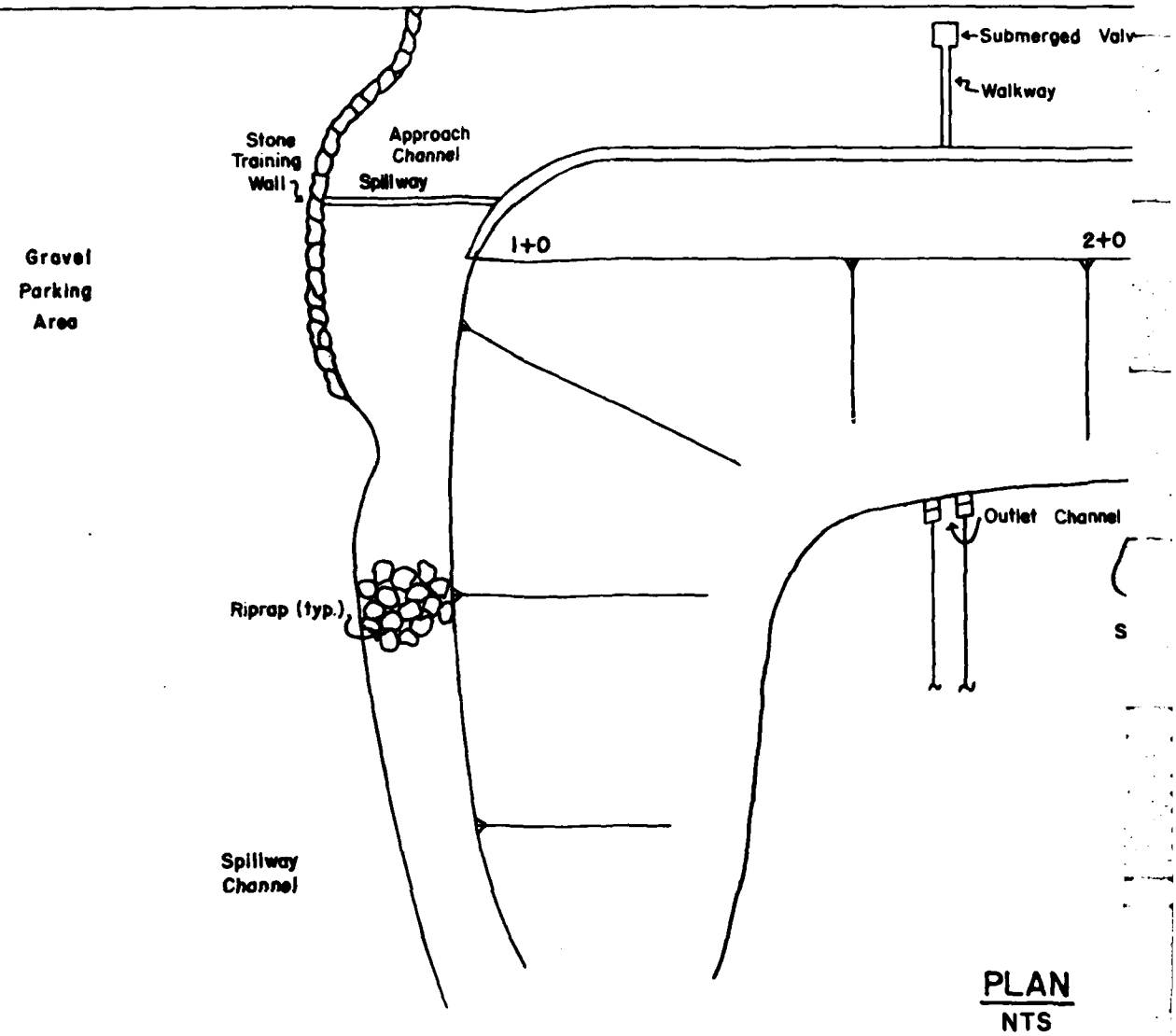
ITEM	REMARKS
AS-BUILT DRAWINGS	None available
REGIONAL VICINITY MAP	Available from U.S.G.S.
CONSTRUCTION HISTORY	None
TYPICAL SECTIONS OF DAM	Field measurements
OUTLETS - Plan	Field measurements
- Details	Field measurements
- Constraints	Unknown
- Discharge Ratings	None available
RAINFALL/RESERVOIR RECORDS	Unavailable
DESIGN REPORTS	None
GEOLOGY REPORTS	None
DESIGN COMPUTATIONS	None
HYDROLOGY & HYDRAULICS	None
DAM STABILITY	None
SEEPAGE STUDIES	None
MATERIALS INVESTIGATIONS	None
BORINGS RECORDS	None
LABORATORY	None
FIELD	

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

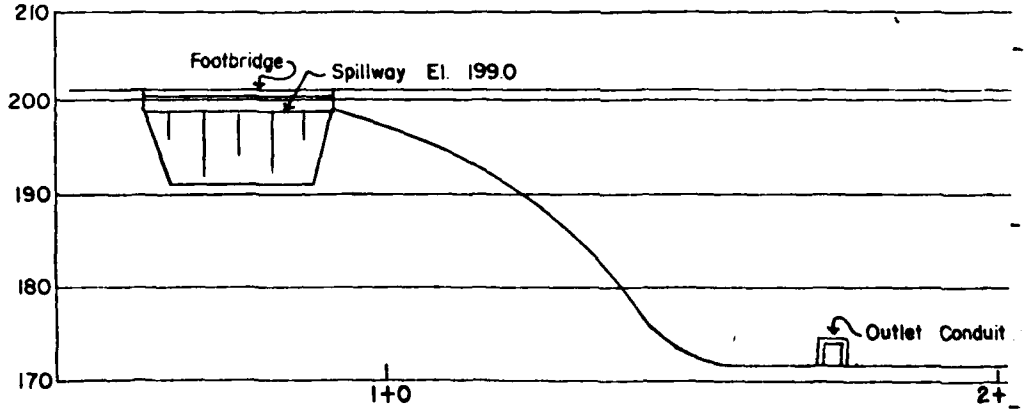
NAME OF DAM Bushy Hill Pond Dam

I.D. NO. CT 00426

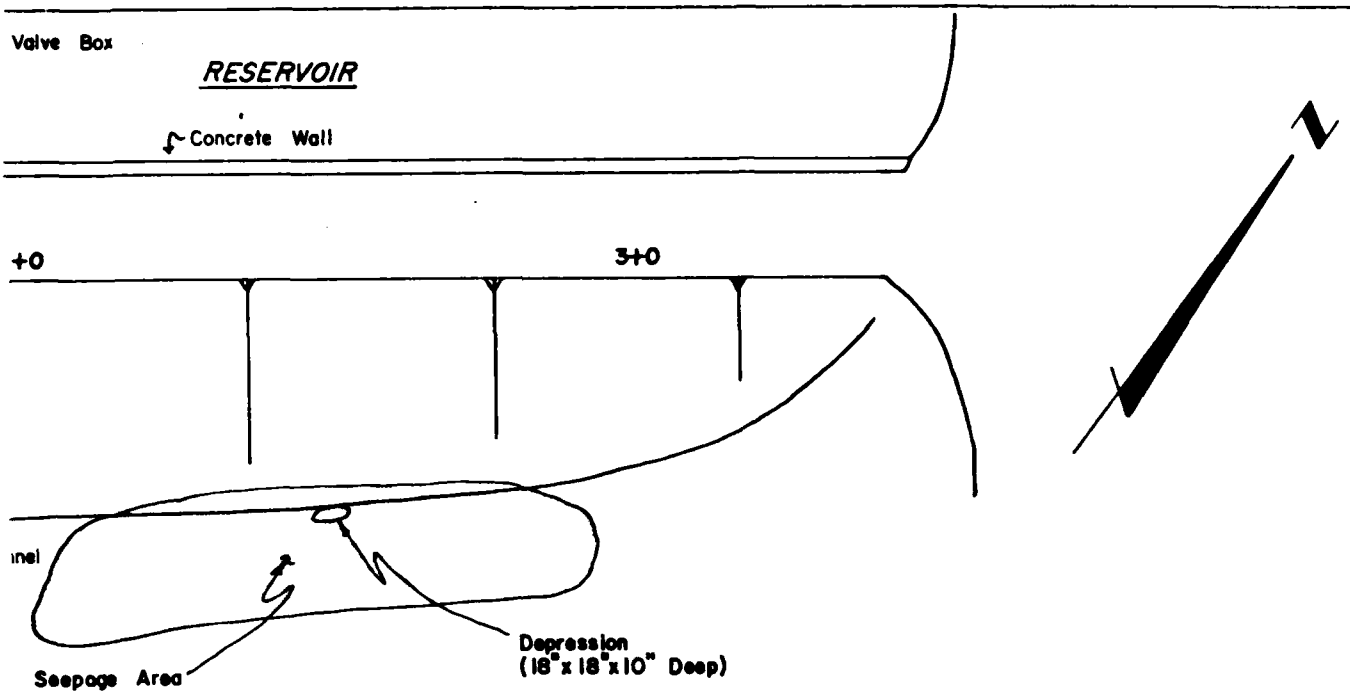
ITEM	REMARKS
POST-CONSTRUCTION SURVEYS OF DAM	None available
BORROW SOURCES	Unknown
MONITORING SYSTEMS	Unknown
MODIFICATIONS	Modifications made to concrete wall u/s face plans not available
HIGH POOL RECORDS	None
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Unknown
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	Unknown
MAINTENANCE OPERATION RECORDS	Unavailable
SPILLWAY PLAN	
SECTIONS	Field measurements
DETAILS	Field measurements
OPERATING EQUIPMENT PLANS & DETAILS	Not available

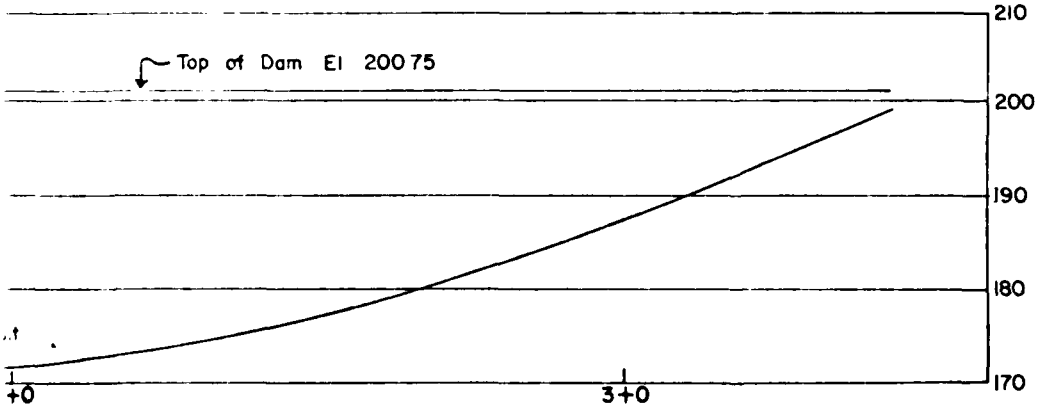


PLAN
NTS



PROFILE
NTS

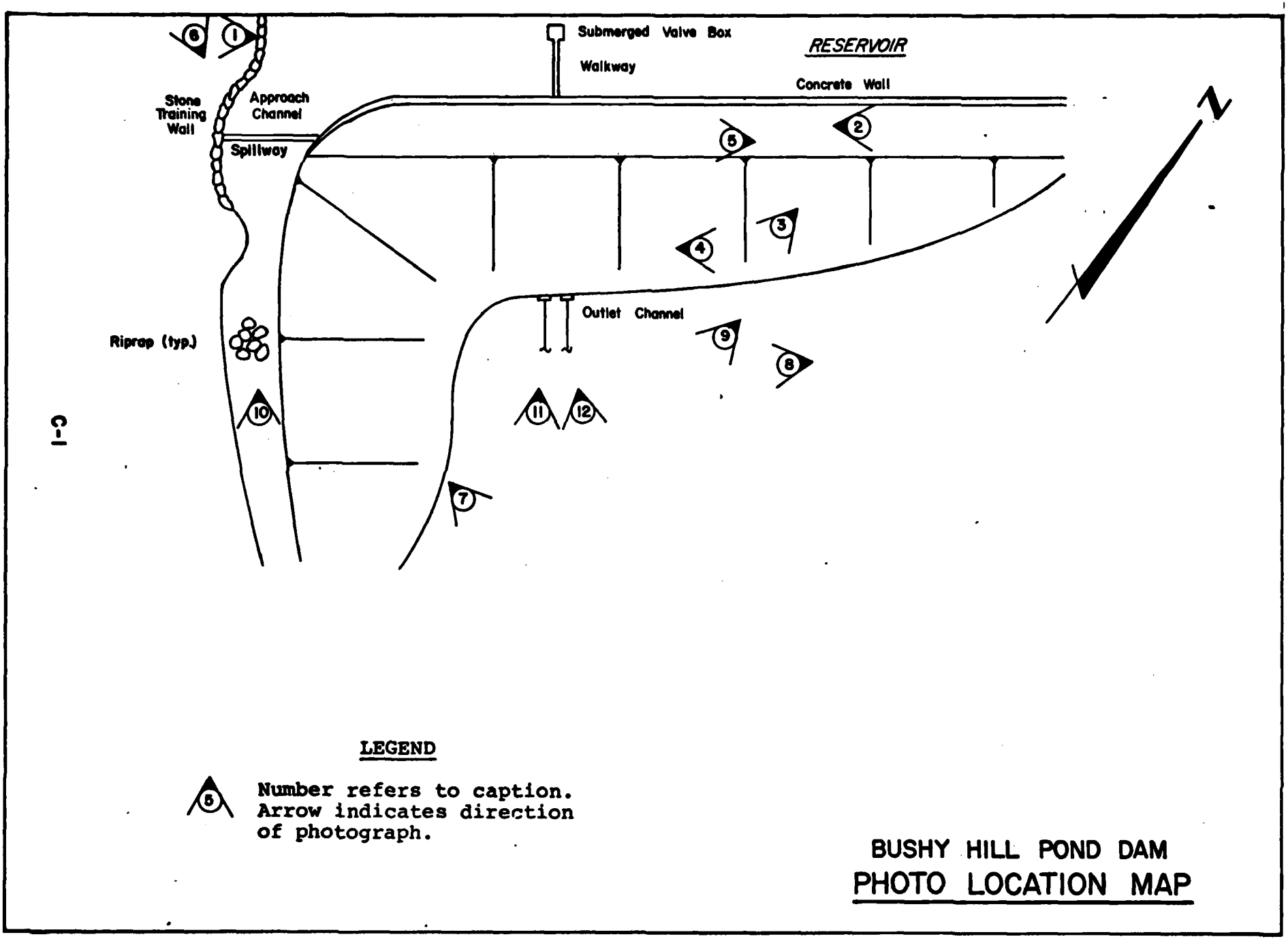




BUSHY HILL POND DAM

APPENDIX C

PHOTOGRAPHS



C-1

LEGEND

5 Number refers to caption. Arrow indicates direction of photograph.

BUSHY HILL POND DAM

PHOTO LOCATION MAP

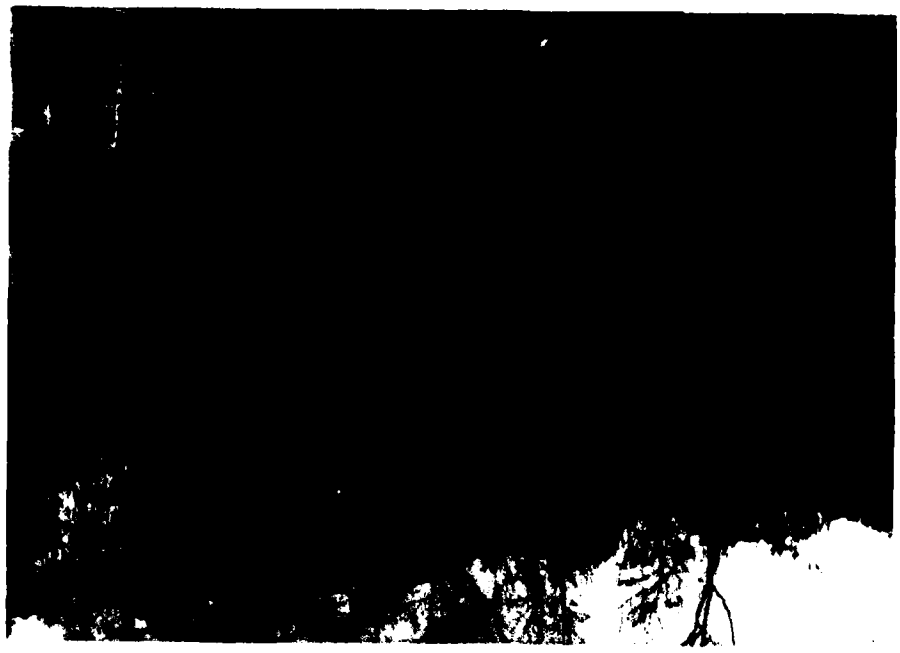


PHOTO #1: Upstream face of dam.

PHOTO #2: Crest of dam from left abutment.

PHOTO #3: Downstream slope, looking toward left abutment.

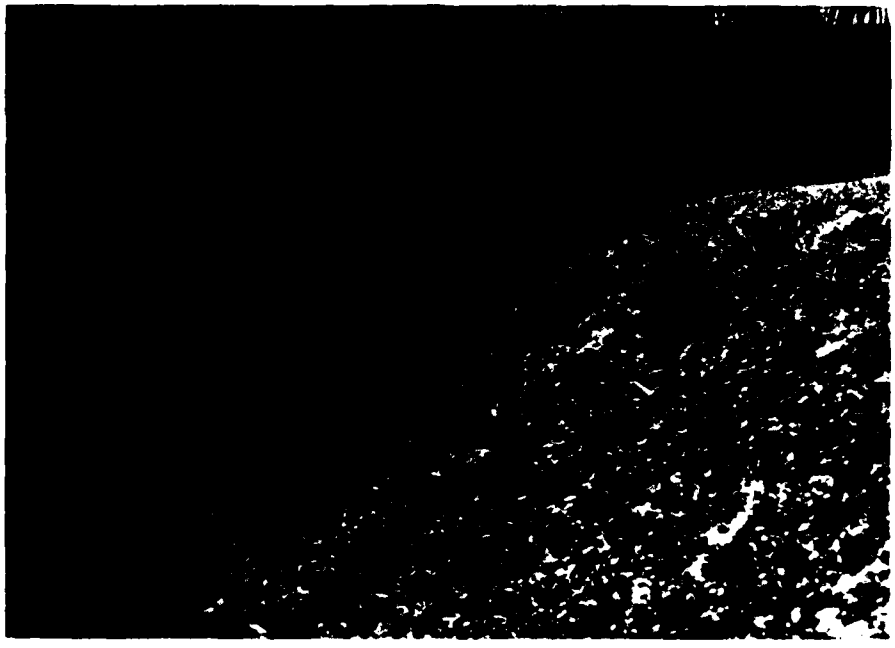


PHOTO #4: Downstream slope, looking toward right abutment.

PHOTO #5: Left abutment.

PHOTO #6: Spillway, from pond.

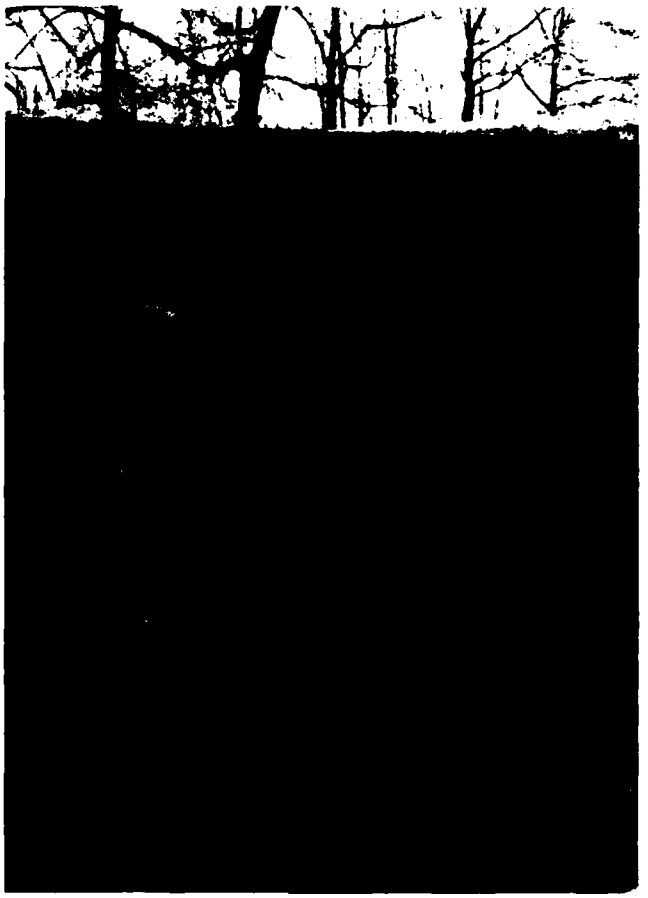


PHOTO #7: Looking toward spillway, from downstream.

PHOTO #8: Wet area at toe of downstream slope.

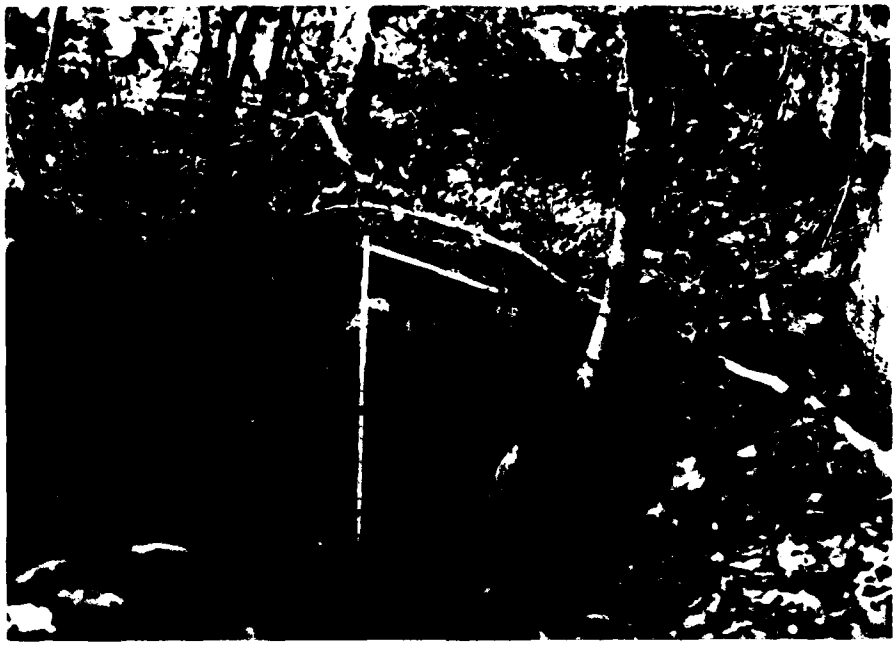


PHOTO #9: Wet area at toe of downstream slope.

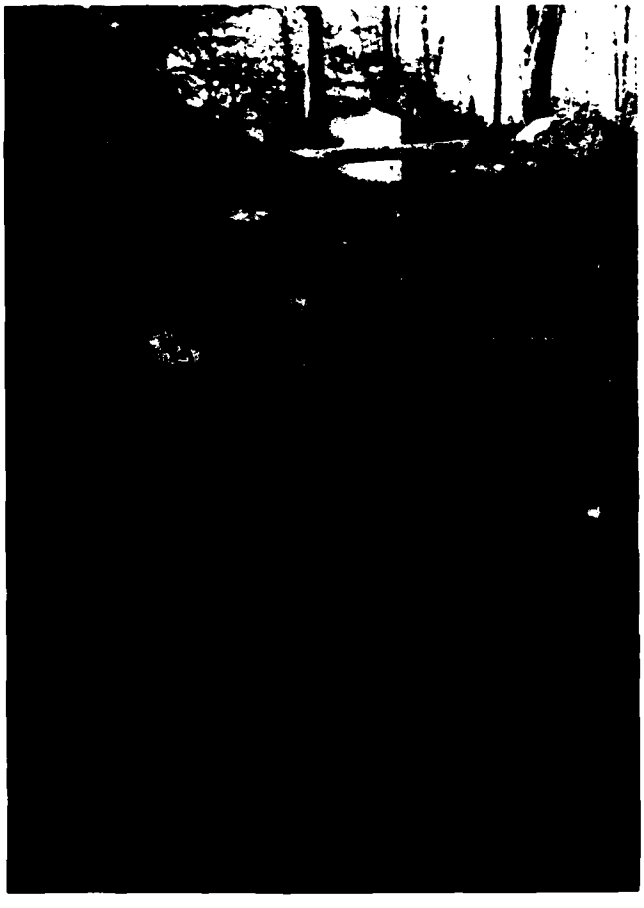


PHOTO #10: Spillway channel, looking upstream.

PHOTO #11: Blow-off outlet.

PHOTO #12: Blow-off outlet, during operation.

PHOTO #13: Reservoir area.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

CT 79 90 10
SHY HILL POND DAM
SEX CONN

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN 06510/203/789-1260

SHEET NO. 1 OF
BY RAC DATE 2-29-80
CHK'D. BY PB DATE 3-19-80

DETERMINATION OF SPILLWAY TEST FLOOD*

A. SIZE CLASSIFICATION

Storage Volume (Ac.-Ft.) 616

Height of Dam (Ft.) 29

Size Classification SMALL

B. HAZARD POTENTIAL CLASSIFICATION

Category	Loss of Life	Economic Loss
Low	None expected	Minimal
Significant	Few	Appreciable
High	More than few	Excessive

Hazard Classification HIGH

C. HYDROLOGIC EVALUATION GUIDELINES

Hazard	Size	Spillway Test Flood
Low	Small	50 to 100-Year Frequency
	Intermediate	100-Year Frequency to 1/2 PMF
	Large	1/2 PMF to PMF
Significant	Small	100-Year Frequency to 1/2 PMF
	Intermediate	1/2 PMF to PMF
	Large	PMF
High	Small	1/2 PMF to PMF
	Intermediate	PMF
	Large	PMF

Spillway Test Flood PMF

*Based upon "Recommended Guidelines for Safety Inspection of Dams" Department of the Army, Office of the Chief of Engineers, November 1976.

JECT 7990 10
SHY HILL POND
SSEX CONN

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

SHEET NO. 2 OF
BY RAC DATE 3-3-80
CHK'D. BY PB DATE 3-19-80

SPILLWAY TEST FLOOD

PEAK FLOW RATES ARE TO BE ESTIMATED BY USING THE U.S. SOIL CONSERVATION SERVICE METHODS AS DESCRIBED IN THE BOOK "DESIGN OF SMALL DAMS", BY THE BUREAU OF RECLAMATION. THE PMP RAINFALL IS 24 INCHES FOR A 6HR. DURATION STORM. USING A 20% FACTOR FOR IMPERFECT FIT THE EFFECTIVE RAINFALL IS 19.2 INCHES (F16 15).

$PMP_{6HR} = 19.2$ INCHES
$PMP_{1HR} = (.5)(19.2) = 9.6$ INCHES

RUNOFF

USING AN ASSUMED CN VALUE OF 80 FROM FIGURE A-4 SCS

1HR RAINFALL = 9.6 IN ∴ RUNOFF = 7.1 IN

6 HR RAINFALL = 19.2 IN ∴ RUNOFF = 16.5 IN

TIME OF CONCENTRATION

$$T_c = \left(\frac{11.9L^3}{H}\right)^{.385} \qquad L = \frac{3000'}{5280'/Mi} = .568\ Mi$$

$$H = \Delta H = 161'$$

$$T_c = \left(\frac{(11.9)(.568)^3}{161}\right)^{.385} = 0.19\ HRS.$$

$$T_p = \frac{D}{2} + 0.6\,T_c$$

WATERSHED AREA = $0.67\ MI^2$

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Q 1 HOUR

$T_p = \frac{D}{2} + 0.6\,T_c = 1/2 + 0.6(0.19) = .614$ SAY 0.6 HRS

$Q_p = \frac{484\,AR}{T_p} = \frac{484(.67)(7.1)}{.614} = 3750$ CFS

Q 6 HOURS

$T_p = \frac{D}{2} + 0.6\,T_c = 6/2 + 0.6(0.19) = 3.114$ SAY 3.1 HRS

$Q_p = \frac{484\,AR}{T_p} = \frac{484(.67)(16.5)}{3.114} = 1718$ CFS

VOLUME OF RUNOFF

1 HOUR DURATION STORM

$\frac{7.1\text{ IN}}{12\text{ IN/FT}} \left(.67\text{ MI}^2\right)\left(\frac{640\text{ AC}}{\text{MI}^2}\right) = 2537$ AC-FT

6 HOUR DURATION STORM

$\frac{16.5\text{ IN}}{12\text{ IN/FT}} \left(.67\text{ MI}^2\right)\left(\frac{640\text{ AC}}{\text{MI}^2}\right) = 589.6$ AC-FT

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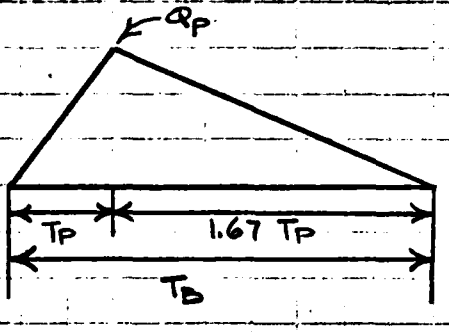
PMF HYDROGRAPH

A TRIANGULAR HYDROGRAPH WILL BE USED WITH PEAK FLOW OF "Q_P" AND A BASE LENGTH OF 2.67 "T_P"



$T_{B_1} = 2.67\ T_P = 2.67\ (.614) = 1.64$ HRS SAY 1.6 HRS

$T_{B_6} = 2.67\ T_P = 2.67\ (3.114) = 8.31$ HRS SAY 8.3 HRS

1 HOUR STORM (HOURS)	PEAK FLOW (CFS)
0	0
0.2	1250
0.4	2500
0.6	3750
0.8	3000
1.0	2250
1.2	1500
1.4	750
1.6	0

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6 HOUR STORM (HOURS)	PEAK FLOW (CFS) PMF	½ PMF
0	0	0
1	554	277
2	1108	554
3	1663	831
3.1	1718	859
4	1421	710
5	1091	545
6	760	380
7	430	215
8	99	49
83	0	0

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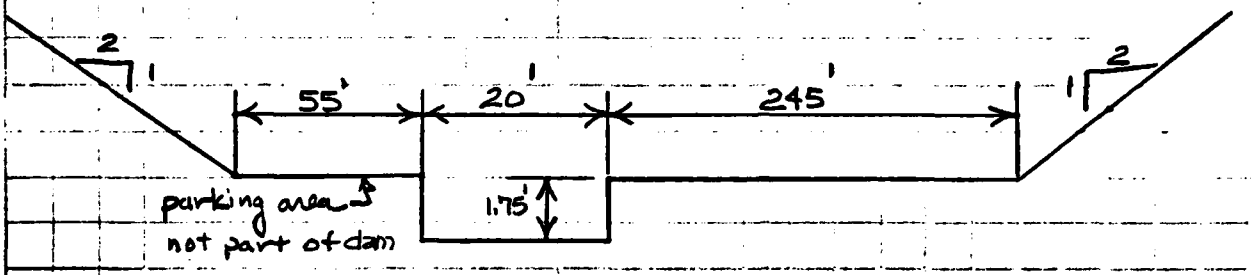
SPILLWAY N.T.S.



SEGMENT	ITEM	"C"	LENGTH	ELEV. (USGS)
1	PARKING LOT	2.5	55'	200.75
2	SPILLWAY BROADCREST STONE & CONC	3.0	20'	199.0
3	EARTHCREST	2.5	245'	200.75

I.E. 199.0
I.V 0
E = 199.0 A = 41.3 Ac
E = 200.0 A = 51.4 Ac
E = 250 A = 152 Ac

ASSUMED BREACH WIDTH = 265(4) = 106'

JECT 79 90 10
ISHY HILL POND
SSEX CONN

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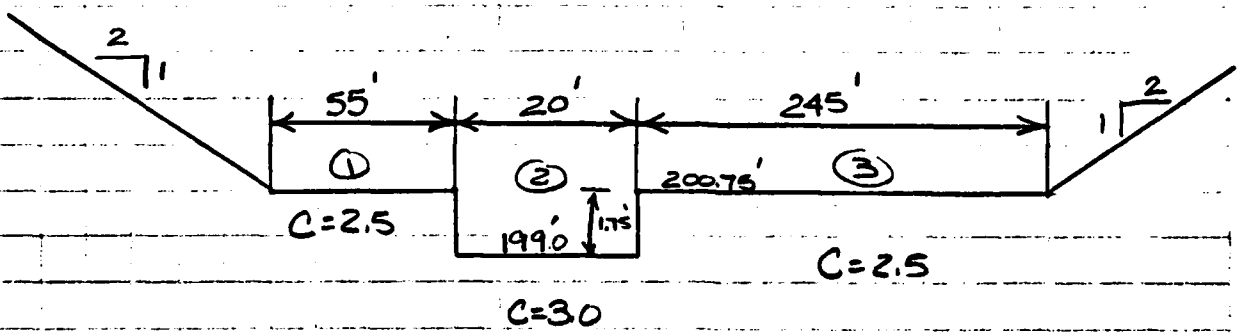
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260.

SHEET NO. 7 OF
BY RAC DATE 3-3-80
CHK'D. BY PB DATE 3-19-80

STAGE DISCHARGE DATA



ELEV (FT)	200.0	200.75	201.0	202.0	203.0
$Q_1 = C_1 L_1 H^{3/2}$ $(2.5)(55)\ H^{3/2}$			17	192	464
$Q_2 = C_2 L_2 H^{3/2}$ $(3.0)(20)\ H^{3/2}$	60	139	170	312	480
$Q_3 = C_3 L_3 H^{3/2}$ $(2.5)(245)\ H^{3/2}$			77	856	2067
TOTAL CAPACITY (CFS)	60	139	264	1360	3011

PROJECT 799010
PISHY HILL POND

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

SHEET NO. 8 OF
BY RAC DATE 3-24-8
CHK'D. BY PB DATE 4-3-80

HSE #	BASE FLOW ELEVATION	FLOODWAVE ELEVATION	FIRST FLOOR ELEVATION	WATER DEPTH BASE FLOW	WATER DEPTH FLOODWAVE
1	105.7	113.0	112	—	1.0
2	105.0	113.1	112	—	1.1
3	104.3	113.2	112	—	1.2
4	103.9	113.2	107	—	6.2
5	102.4	111.0	106	—	5.0
6	100.9	109.1	100	0.9	9.1
7	99.9	103.4	102	—	3.4
8	97.9	105.4	97	0.9	8.4
9	94.9	101.6	92	2.9	9.6
10	90.4	96.0	92	—	4.0
11	78.4	81	78	0.4	3.0
12	78.4	81	100	—	—
13	78.4	81	92	—	—
14	78.4	81	92	—	—
15	78.4	81	91	—	—
16	62.6	70.3	67	—	3.3
17	62.6	70.3	66	—	4.3
18	62.3	69.8	67	—	2.8
19	62.3	69.8	68	—	1.8
20	61.6	68.9	64	—	4.9
21	61.6	68.9	68	—	0.9
22	59.7	66.2	65	—	1.2
23	59.8	66.4	64	—	2.4
24	59.8	66.4	64	—	2.4
25	60.0	66.6	64	—	2.6
26	59.7	66.1	62	—	4.1
27	58.7	64.8	62	—	2.8
28	60.7	67.6	64	—	3.6
29	60.7	67.6	60	0.7	7.6
30	60.5	67.5	60	0.5	7.5
31	59.7	66.2	60	—	6.2
32	59.7	64.8	60	—	4.8
33	59.0	65.3	62	—	3.3
34	58.0	63.9	60	—	3.9
35	57.1	63.0	60	—	3.0
36	57.1	63.0	60	—	3.0
37	54.8	60.5	60	—	0.5

JECT 799010
SHY HILL POND

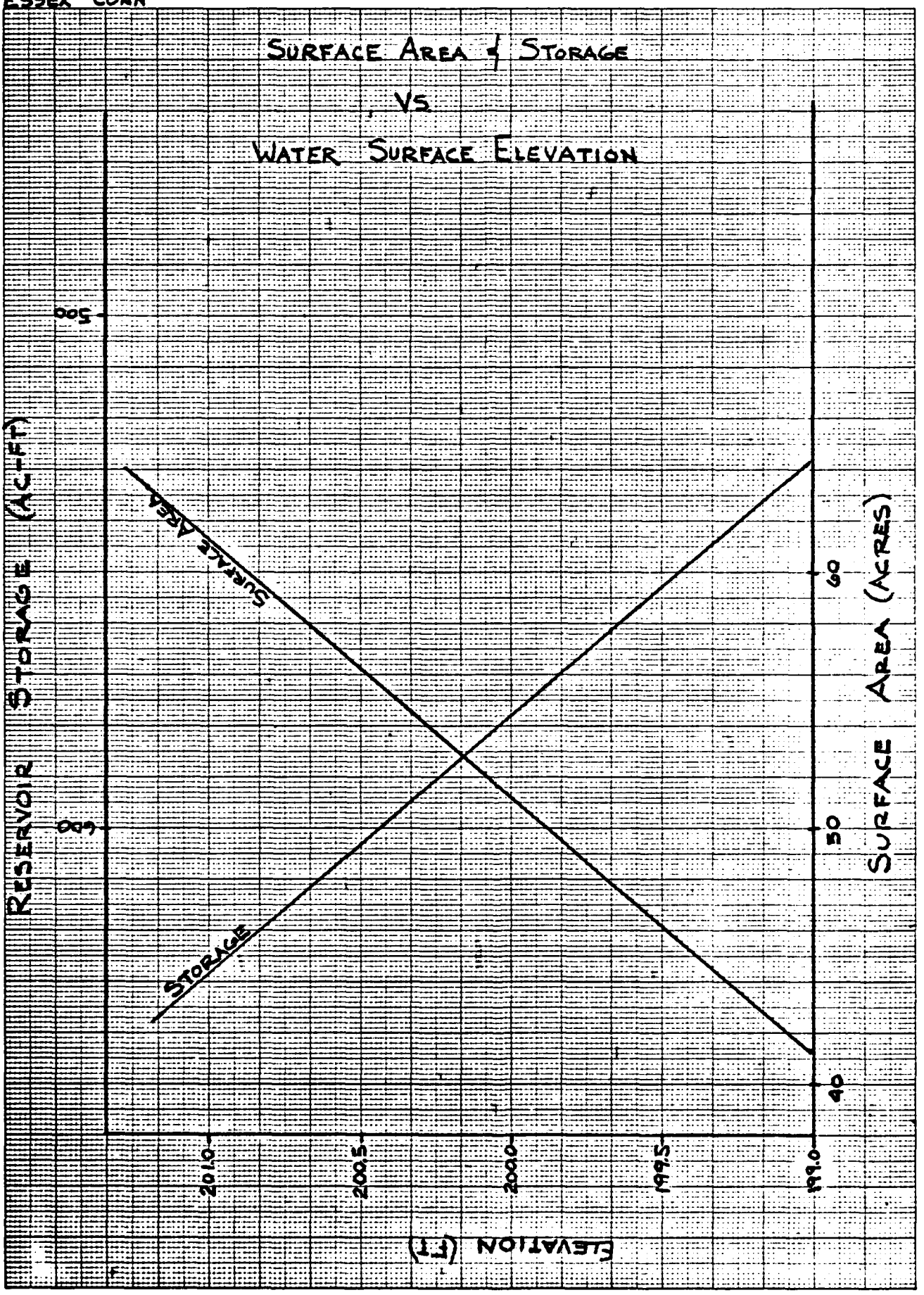
FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

SHEET NO. 9 OF
BY RAC DATE 3-25-8
CHK'D. BY PB DATE 4-3-8

HSE #	BASE FLOW ELEVATION	FLOODWAVE ELEVATION	FIRST FLOOR ELEVATION	WATER DEPTH BASE FLOW	WATER DEPTH FLOODWAVE
38	54.8	60.5	60	–	0.5
39	53.3	58.9	56	–	2.9
40	58.7	58.4	56	2.7	2.4
41	52.0	57.5	55	–	2.5
42	52.0	56.6	54	–	2.6
43	46.8	52.0	51	–	1.0
44	41.7	46.5	42	–	4.5
45	39.1	43.7	43	–	0.7

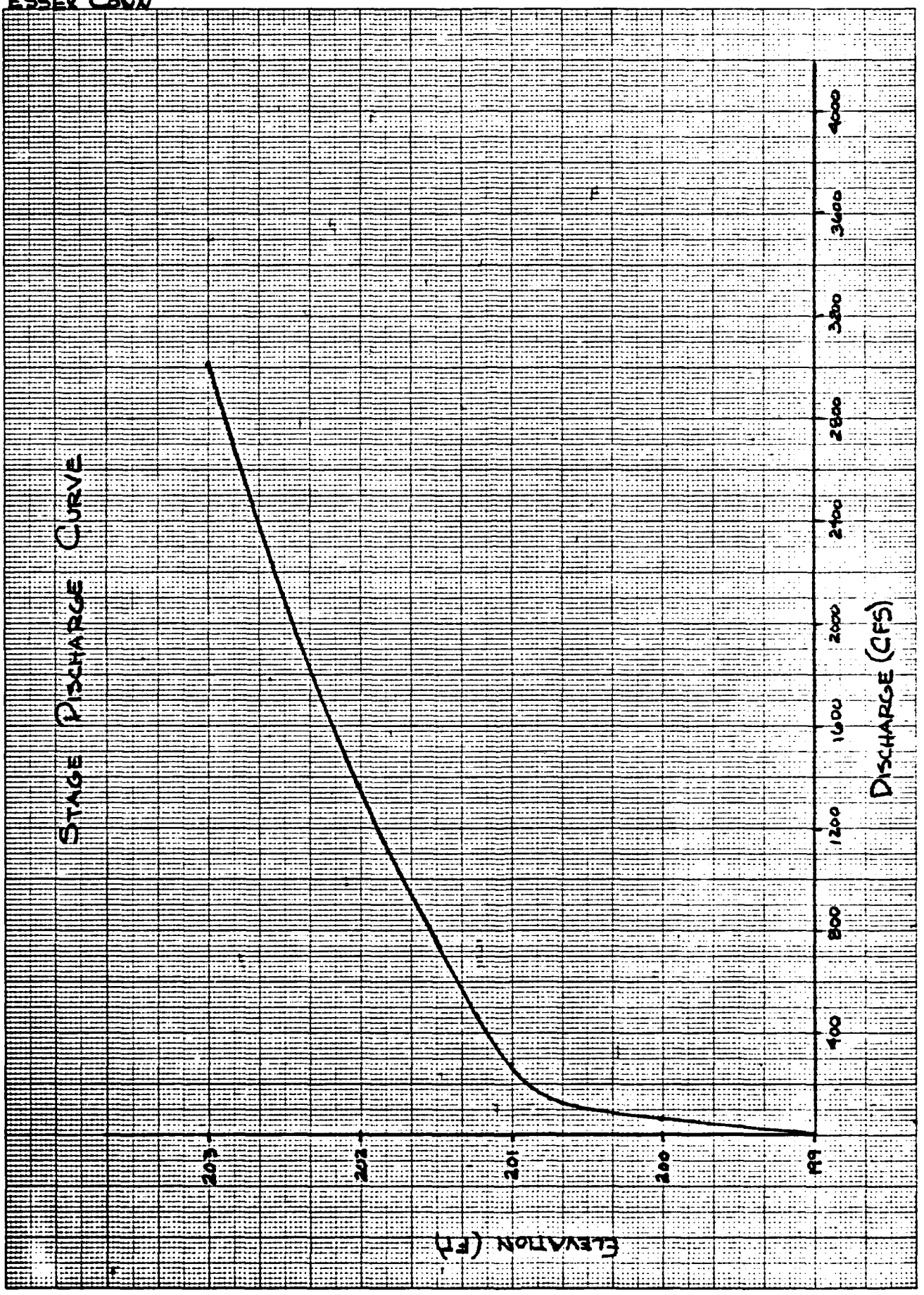
799010
BUSHY HILL POND
ESSEX CONN

RAC 3-3-80
PB 4-3-80



799010
BUSHY HILL POND
ESSEX CONN

RAC 3-24-80
PB 4-3-80



BUSHY HILL POND 793010 RAC MARCH 24, 1980
CK. PB -4-3-80

FGA FLOOD WAVE ROUTING

APPROXIMATE FLOOD WAVE ROUTING BASED UPON U.S. ARMY CORPS OF ENGINEERS' "RULE OF THUMB GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS" DATED APRIL, 1978.

INITIAL STATION = 0 +0
INITIAL BASE FLOW = 139 CFS
INITIAL WAVE HEIGHT = 29.0 FT
ASSUMED BREACH WIDTH = 106.0 FT
INITIAL RESERVOIR STORAGE = 616 ACRE-FT
COMPUTED FLOOD WAVE PEAK FLOW = 27,815 CFS
TOTAL FLOOD WAVE PEAK FLOW = 27,954CFS

STATION 0+30

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.080			
-390.0 FT	270.0 FT	-290.0 FT	250.0 FT	-120.0 FT	210.0 FT
-50.0 FT	200.0 FT	-12.0 FT	200.0 FT		
		N = 0.040			
-12.0 FT	200.0 FT	-8.0 FT	197.0 FT	8.0 FT	197.0 FT
12.0 FT	200.0 FT				
		N = 0.080			
12.0 FT	200.0 FT	280.0 FT	210.0 FT	390.0 FT	240.0 FT
530.0 FT	250.0 FT	670.0 FT	270.0 FT		

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
487.9 SF	91.5 FT	0.080	15.5 FPS	7,575CFS
241.5 SF	26.0 FT	0.040	44.9 FPS	10,864CFS
767.1 SF	202.9 FT	0.080	12.3 FPS	9,471CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
197.0 FT	10.5 FT	207.5 FT	1,496 SF	18.6 FPS	27,911 CFS	0.0750

BASE FLOW = 139 CFS BASE STAGE = 197.9 FT.

STATION 3 +0

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.080			
-420.0 FT	250.0 FT	-130.0 FT	200.0 FT	-40.0 FT	180.0 FT
-12.0 FT	180.0 FT				
		N = 0.040			
-12.0 FT	180.0 FT	-8.0 FT	177.0 FT	8.0 FT	177.0 FT
12.0 FT	180.0 FT				
		N = 0.080			
12.0 FT	180.0 FT	90.0 FT	180.0 FT	170.0 FT	200.0 FT
300.0 FT	240.0 FT	380.0 FT	250.0 FT	500.0 FT	260.0 FT

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
331.8 SF	62.2 FT	0.080	15.4 FPS	5,119CFS
238.1 SF	26.0 FT	0.040	44.2 FPS	10,538CFS
689.3 SF	108.6 FT	0.080	17.3 FPS	11,940CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
177.0 FT	10.4 FT	187.4 FT	1,259 SF	21.9 FPS	27,598 CFS	0.0740

BASE FLOW = 139 CFS BASE STAGE = 177.9 FT.

STATION 12+50

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.080			
-520.0 FT	250.0 FT	-220.0 FT	200.0 FT	-40.0 FT	150.0 FT
-12.0 FT	148.0 FT				
		N = 0.040			
-12.0 FT	148.0 FT	-8.0 FT	145.0 FT	8.0 FT	145.0 FT
12.0 FT	148.0 FT				
		N = 0.080			
12.0 FT	148.0 FT	30.0 FT	150.0 FT	200.0 FT	200.0 FT
270.0 FT	220.0 FT				

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
521.7 SF	67.3 FT	0.080	13.4 FPS	6,995CFS
360.4 SF	26.0 FT	0.040	39.5 FPS	14,251CFS
395.5 SF	55.3 FT	0.080	12.6 FPS	5,022CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
145.0 FT	15.5 FT	160.5 FT	1,277 SF	20.5 FPS	26,269 CFS	0.0340

BASE FLOW = 139 CFS BASE STAGE = 146.1 FT.

STATION 21+80

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.080			
-450.0 FT	200.0 FT	-320.0 FT	190.0 FT	-180.0 FT	150.0 FT
-50.0 FT	130.0 FT	-12.0 FT	115.0 FT		
		N = 0.040			
-12.0 FT	115.0 FT	-8.0 FT	112.0 FT	8.0 FT	112.0 FT
12.0 FT	115.0 FT				
		N = 0.080			
12.0 FT	115.0 FT	150.0 FT	120.0 FT	420.0 FT	140.0 FT
780.0 FT	140.0 FT	850.0 FT	150.0 FT		

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
304.2 SF	57.9 FT	0.080	10.5 FPS	3,195CFS
285.6 SF	26.0 FT	0.040	34.3 FPS	9,810CFS
1,083.1 SF	197.6 FT	0.080	10.8 FPS	11,698CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
112.0 FT	12.4 FT	124.4 FT	1,672 SF	14.7 FPS	24,703 CFS	0.0350

BASE FLOW = 139 CFS BASE STAGE = 113.1 FT.

STATION 26+50

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.080			
-400.0 FT	150.0 FT	-170.0 FT	108.0 FT		
		N = 0.040			
-170.0 FT	108.0 FT	200.0 FT	108.0 FT		
		N = 0.080			
200.0 FT	108.0 FT	350.0 FT	110.0 FT	500.0 FT	150.0 FT

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
74.5 SF	29.0 FT	0.080	3.3 FPS	246CFS
1,930.2 SF	370.0 FT	0.040	10.6 FPS	20,462CFS
651.9 SF	162.4 FT	0.080	4.4 FPS	2,900CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
108.0 FT	5.2 FT	113.2 FT	2,656 SF	8.8 FPS	23,609 CFS	0.0090

BASE FLOW = 139 CFS BASE STAGE = 108.2 FT.

STATION 32+50

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.080			
-850.0 FT	110.0 FT	-310.0 FT	110.0 FT	-10.0 FT	104.0 FT
		N = 0.040			
-10.0 FT	104.0 FT	-5.0 FT	102.0 FT	5.0 FT	102.0 FT
10.0 FT	104.0 FT				
		N = 0.080			
10.0 FT	104.0 FT	70.0 FT	110.0 FT	300.0 FT	150.0 FT

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
3,372.5 SF	840.0 FT	0.080	4.6 FPS	15,824CFS
208.8 SF	20.7 FT	0.040	17.3 FPS	3,615CFS
381.5 SF	77.4 FT	0.080	5.3 FPS	2,051CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
102.0 FT	10.9 FT	112.9 FT	3,962 SF	5.4 FPS	21,490 CFS	0.0100

BASE FLOW = 139 CFS BASE STAGE = 103.9 FT.

STATION 41 +0

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.080			
-2400.0 FT	100.0 FT	-2100.0 FT	80.0 FT	-10.0 FT	79.0 FT
		N = 0.040			
-10.0 FT	79.0 FT	-5.0 FT	77.0 FT	5.0 FT	77.0 FT
10.0 FT	79.0 FT				
		N = 0.080			
10.0 FT	79.0 FT	600.0 FT	80.0 FT	850.0 FT	100.0 FT

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
3,233.8 SF	2105.6 FT	0.080	4.2 FPS	13,616CFS
70.8 SF	20.7 FT	0.040	14.3 FPS	1,016CFS
917.3 SF	603.0 FT	0.080	4.1 FPS	3,838CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
77.0 FT	4.0 FT	81.0 FT	4,222 SF	4.3 FPS	18,470 CFS	0.0290

BASE FLOW = 139 CFS BASE STAGE = 78.4 FT.

STATION 56 +0

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.080			
-250.0 FT	110.0 FT	-50.0 FT	70.0 FT	-48.0 FT	68.0 FT
		N = 0.040			
-48.0 FT	68.0 FT	48.0 FT	68.0 FT		
		N = 0.050			
48.0 FT	68.0 FT	50.0 FT	70.0 FT	320.0 FT	100.0 FT

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
200.0 SF	46.2 FT	0.080	3.8 FPS	764CFS
1,008.9 SF	96.0 FT	0.040	13.8 FPS	13,930CFS
344.8 SF	79.8 FT	0.050	6.1 FPS	2,105CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
68.0 FT	10.5 FT	78.5 FT	1,553 SF	10.8 FPS	16,799 CFS	0.0060

BASE FLOW = 139 CFS BASE STAGE = 68.6 FT.

STATION 72 +0

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.080			
-1050.0 FT	100.0 FT	-200.0 FT	60.0 FT	-10.0 FT	58.0 FT
		N = 0.040			
-10.0 FT	58.0 FT	-5.0 FT	56.0 FT	5.0 FT	56.0 FT
10.0 FT	58.0 FT				
		N = 0.050			
10.0 FT	58.0 FT	180.0 FT	60.0 FT	700.0 FT	70.0 FT
900.0 FT	100.0 FT				

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
1,119.5 SF	275.0 FT	0.080	4.2 FPS	4,741CFS
149.9 SF	20.7 FT	0.040	12.4 FPS	1,861CFS
1,265.3 SF	377.9 FT	0.050	5.9 FPS	7,527CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
56.0 FT	7.9 FT	63.9 FT	2,534 SF	5.5 FPS	14,130 CFS	0.0080

BASE FLOW = 139 CFS BASE STAGE = 58.0 FT.

STATION 94 +0

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		N = 0.050			
-450.0 FT	50.0 FT	-300.0 FT	40.0 FT	-10.0 FT	40.0 FT
		N = 0.040			
-10.0 FT	40.0 FT	-5.0 FT	37.0 FT	5.0 FT	37.0 FT
10.0 FT	40.0 FT				
		N = 0.050			
10.0 FT	40.0 FT	100.0 FT	40.0 FT	400.0 FT	50.0 FT

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
1,178.9 SF	345.7 FT	0.050	6.3 FPS	7,530CFS
119.1 SF	21.6 FT	0.040	10.9 FPS	1,309CFS
540.2 SF	201.3 FT	0.050	5.4 FPS	2,941CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
37.0 FT	6.7 FT	43.7 FT	1,838 SF	6.4 FPS	11,781 CFS	0.0090

BASE FLOW = 139 CFS BASE STAGE = 39.1 FT.

BUSHY HILL POND PMF 1 HOUR 799010 FLOOD ROUTING RAC MARCH 24, 19

CK. PB 4-3-80

INPUT DATA: UNSUBMERGED WEIR

SEGMENT 1	DISCHARGE COEFFICIENT =	2.5	LENGTH OF WEIR =	55	ELEVATION OF WEIR = 200.75
SEGMENT 2	DISCHARGE COEFFICIENT =	3	LENGTH OF WEIR =	20	ELEVATION OF WEIR = 199
SEGMENT 3	DISCHARGE COEFFICIENT =	2.5	LENGTH OF WEIR =	245	ELEVATION OF WEIR = 200.75

IE=199.0 IV= 0.0 E=199.0 A= 41.30 E=200.0 A= 51.40 E=250.0 A=152.00

HOUR	INFLOW	MASS INFLOW	WATER EL.	TAIL WATER	OUTFLOW	MASS OUTFLOW	STORAGE(R)	STORAGE(A)
0.00	0CFS	0.00AC-F	199.00FT	.00FT	0CFS	0.00AC-F	0.00AC-F	0.00AC-F
0.20	1,250CFS	10.33AC-F	199.24FT	0.00FT	7CFS	0.05AC-F	10.27AC-F	10.27AC-F
0.40	2,500CFS	41.32AC-F	199.89FT	0.00FT	50CFS	0.53AC-F	40.78AC-F	40.78AC-F
0.60	3,750CFS	92.97AC-F	200.84FT	0.00FT	173CFS	2.38AC-F	90.59AC-F	90.59AC-F
0.80	3,000CFS	148.76AC-F	201.70FT	0.00FT	967CFS	11.81AC-F	136.94AC-F	136.94AC-F
1.00	2,250CFS	192.14AC-F	202.11FT	0.00FT	1,529CFS	32.45AC-F	159.69AC-F	159.69AC-F
1.20	1,500CFS	223.14AC-F	202.20FT	0.00FT	1,654CFS	58.76AC-F	164.37AC-F	164.37AC-F
1.40	750CFS	241.73AC-F	202.07FT	0.00FT	1,463CFS	84.54AC-F	157.19AC-F	157.19AC-F
1.60	0CFS	247.93AC-F	201.80FT	0.00FT	1,091CFS	105.65AC-F	142.27AC-F	142.27AC-F
1.80	0CFS	247.93AC-F	201.52FT	0.00FT	751CFS	120.89AC-F	127.04AC-F	127.04AC-F
2.00	0CFS	247.93AC-F	201.32FT	0.00FT	542CFS	131.58AC-F	116.34AC-F	116.34AC-F
2.40	0CFS	247.93AC-F	201.06FT	0.00FT	310CFS	145.68AC-F	102.24AC-F	102.25AC-F
2.80	0CFS	247.93AC-F	200.90FT	0.00FT	204CFS	154.19AC-F	93.73AC-F	93.73AC-F
3.20	0CFS	247.93AC-F	200.79FT	0.00FT	151CFS	160.07AC-F	87.86AC-F	87.86AC-F
4.00	0CFS	247.93AC-F	200.62FT	0.00FT	124CFS	169.18AC-F	78.75AC-F	78.75AC-F

PMF

BUSHY HILL POND 6 HOUR 799010 FLOOD ROUTING RAC MARCH 24, 19

CK PB 4-3-80

INPUT DATA: UNSUBMERGED WEIR

SEGMENT 1	DISCHARGE COEFFICIENT =	2.5	LENGTH OF WEIR =	55	ELEVATION OF WEIR = 200.75
SEGMENT 2	DISCHARGE COEFFICIENT =	3	LENGTH OF WEIR =	20	ELEVATION OF WEIR = 199
SEGMENT 3	DISCHARGE COEFFICIENT =	2.5	LENGTH OF WEIR =	245	ELEVATION OF WEIR = 200.75

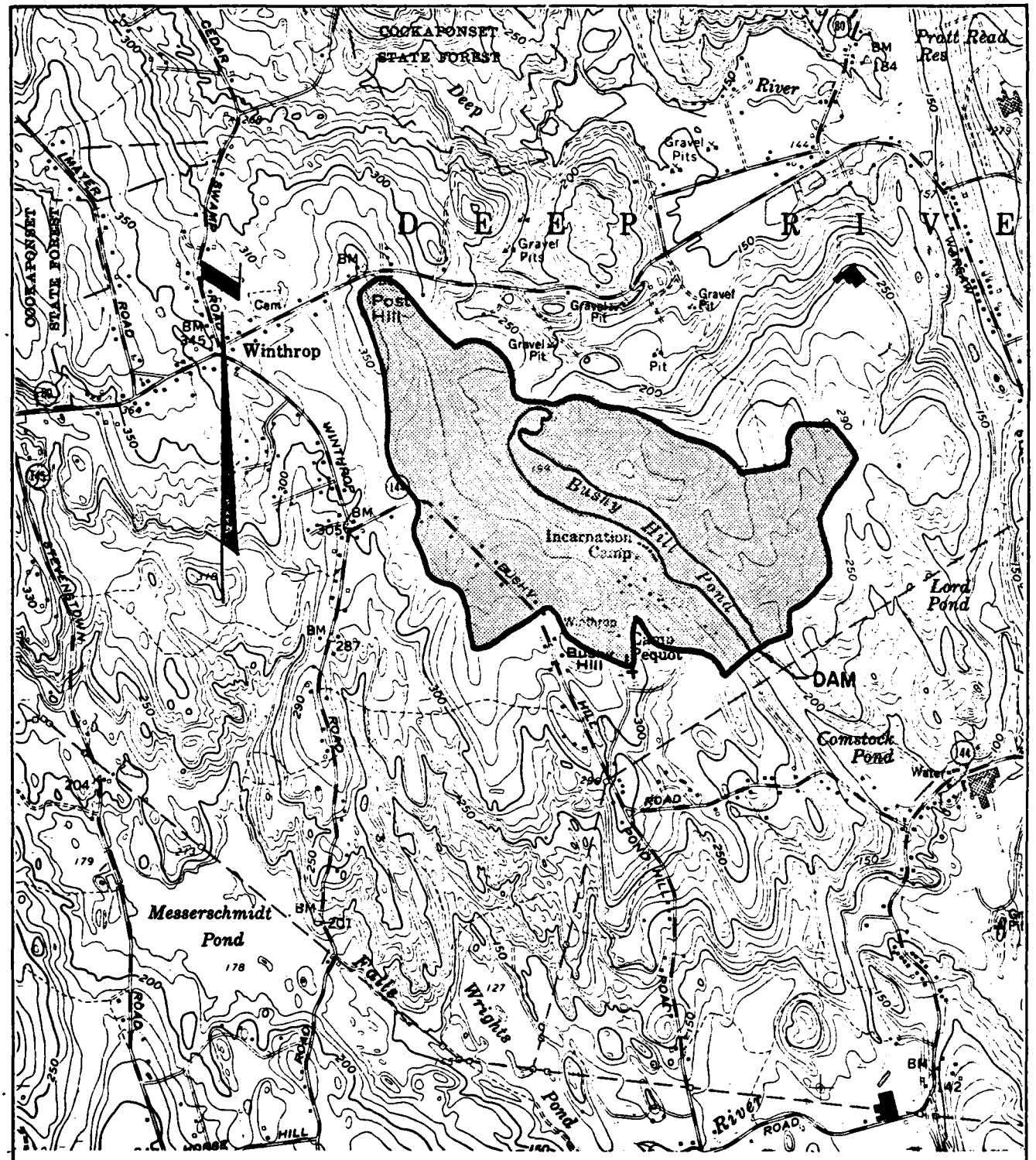
IE=199.0 IV= 0.0 E=199.0 A= 41.30 E=200.0 A= 51.40 E=250.0 A=152.00

HOUR	INFLOW	MASS INFLOW	WATER EL.	TAIL WATER	OUTFLOW	MASS OUTFLOW	STORAGE(R)	STORAGE(A)
0.00	0CFS	0.00AC-F	199.00FT	.00FT	0CFS	0.00AC-F	0.00AC-F	0.00AC-F
1.00	554CFS	22.89AC-F	199.50FT	0.00FT	21CFS	0.88AC-F	22.01AC-F	22.01AC-F
2.00	1,108CFS	91.57AC-F	200.72FT	0.00FT	136CFS	7.38AC-F	84.18AC-F	84.18AC-F
3.00	1,663CFS	206.07AC-F	201.85FT	0.00FT	1,160CFS	60.94AC-F	145.13AC-F	145.13AC-F
3.10	1,718CFS	220.04AC-F	201.92FT	0.00FT	1,257CFS	70.93AC-F	149.11AC-F	149.11AC-F
4.00	1,421CFS	336.78AC-F	202.14FT	0.00FT	1,562CFS	175.83AC-F	160.95AC-F	160.95AC-F
5.00	1,091CFS	440.58AC-F	201.91FT	0.00FT	1,246CFS	291.92AC-F	148.66AC-F	148.66AC-F
6.00	760CFS	517.07AC-F	201.67FT	0.00FT	929CFS	381.82AC-F	135.24AC-F	135.24AC-F
7.00	430CFS	566.24AC-F	201.40FT	0.00FT	619CFS	445.81AC-F	120.43AC-F	120.43AC-F
8.00	99CFS	588.10AC-F	201.08FT	0.00FT	325CFS	484.84AC-F	103.26AC-F	103.26AC-F
8.30	0CFS	589.33AC-F	200.97FT	0.00FT	246CFS	491.93AC-F	97.40AC-F	97.40AC-F
9.00	0CFS	589.33AC-F	200.76FT	0.00FT	141CFS	503.15AC-F	86.17AC-F	86.17AC-F
10.00	0CFS	589.33AC-F	200.56FT	0.00FT	116CFS	513.84AC-F	75.48AC-F	75.48AC-F
11.00	0CFS	589.33AC-F	200.39FT	0.00FT	98CFS	522.74AC-F	66.58AC-F	66.58AC-F
12.00	0CFS	589.33AC-F	200.24FT	0.00FT	83CFS	530.26AC-F	59.07AC-F	59.07AC-F

BUSHY HILL POND 1/2 PMF 6 HOUR 799010 FLOOD ROUTING RAC MARCH 24, 19
CK PB 4-3-

INPUT DATA: UNSUBMERGH 1 WEIR
SEGMENT 1 DISCHARGE COEFFICIENT = 2.5 LENGTH OF WEIR = 55 ELEVATION OF WEIR = 200.75
SEGMENT 2 DISCHARGE COEFFICIENT = 3 LENGTH OF WEIR = 20 ELEVATION OF WEIR = 199
SEGMENT 3 DISCHARGE COEFFICIENT = 2.5 LENGTH OF WEIR = 245 ELEVATION OF WEIR = 200.75
IE=199.0 IV= 0.0 E=199.0 A= 41.30 E=200.0 A= 51.40 E=250.0 A=152.00

HOUR	INFLOW	MASS INFLOW	WATER EL.	TAIL WATER	OUTFLOW	MASS OUTFLOW	STORAGE(R)	STORAGE(A)
0.00	0CFS	0.00AC-F	199.00FT	.00FT	0CFS	0.00AC-F	0.00AC-F	0.00AC-F
1.00	277CFS	11.44AC-F	199.26FT	0.00FT	7CFS	0.33AC-F	11.11AC-F	11.11AC-F
2.00	554CFS	45.78AC-F	199.93FT	0.00FT	54CFS	2.89AC-F	42.89AC-F	42.89AC-F
3.00	831CFS	103.01AC-F	200.84FT	0.00FT	174CFS	12.31AC-F	90.69AC-F	90.69AC-F
3.10	859CFS	109.99AC-F	200.94FT	0.00FT	229CFS	13.98AC-F	96.01AC-F	96.01AC-F
4.00	710CFS	168.35AC-F	201.42FT	0.00FT	645CFS	46.54AC-F	121.80AC-F	121.80AC-F
5.00	545CFS	220.21AC-F	201.41FT	0.00FT	629CFS	99.24AC-F	120.96AC-F	120.96AC-F
6.00	380CFS	258.43AC-F	201.26FT	0.00FT	484CFS	145.28AC-F	113.15AC-F	113.15AC-F
7.00	215CFS	283.02AC-F	201.09FT	0.00FT	334CFS	179.13AC-F	103.88AC-F	103.88AC-F
8.00	49CFS	293.92AC-F	200.89FT	0.00FT	195CFS	201.03AC-F	92.89AC-F	92.89AC-F
8.30	0CFS	294.53AC-F	200.81FT	0.00FT	160CFS	205.44AC-F	89.09AC-F	89.09AC-F
9.00	0CFS	294.53AC-F	200.66FT	0.00FT	128CFS	213.80AC-F	80.73AC-F	80.73AC-F
10.00	0CFS	294.53AC-F	200.47FT	0.00FT	107CFS	223.54AC-F	70.99AC-F	70.99AC-F
12.00	0CFS	294.53AC-F	200.18FT	0.00FT	77CFS	238.80AC-F	55.73AC-F	55.73AC-F



SCALE IN FEET

2000 1000 0 2000

BUSHY HILL POND DAM

DRAINAGE MAP

DEEP RIVER , CONNECTICUT

FLAHERTY • GIAVARA ASSOCIATES, P.C.

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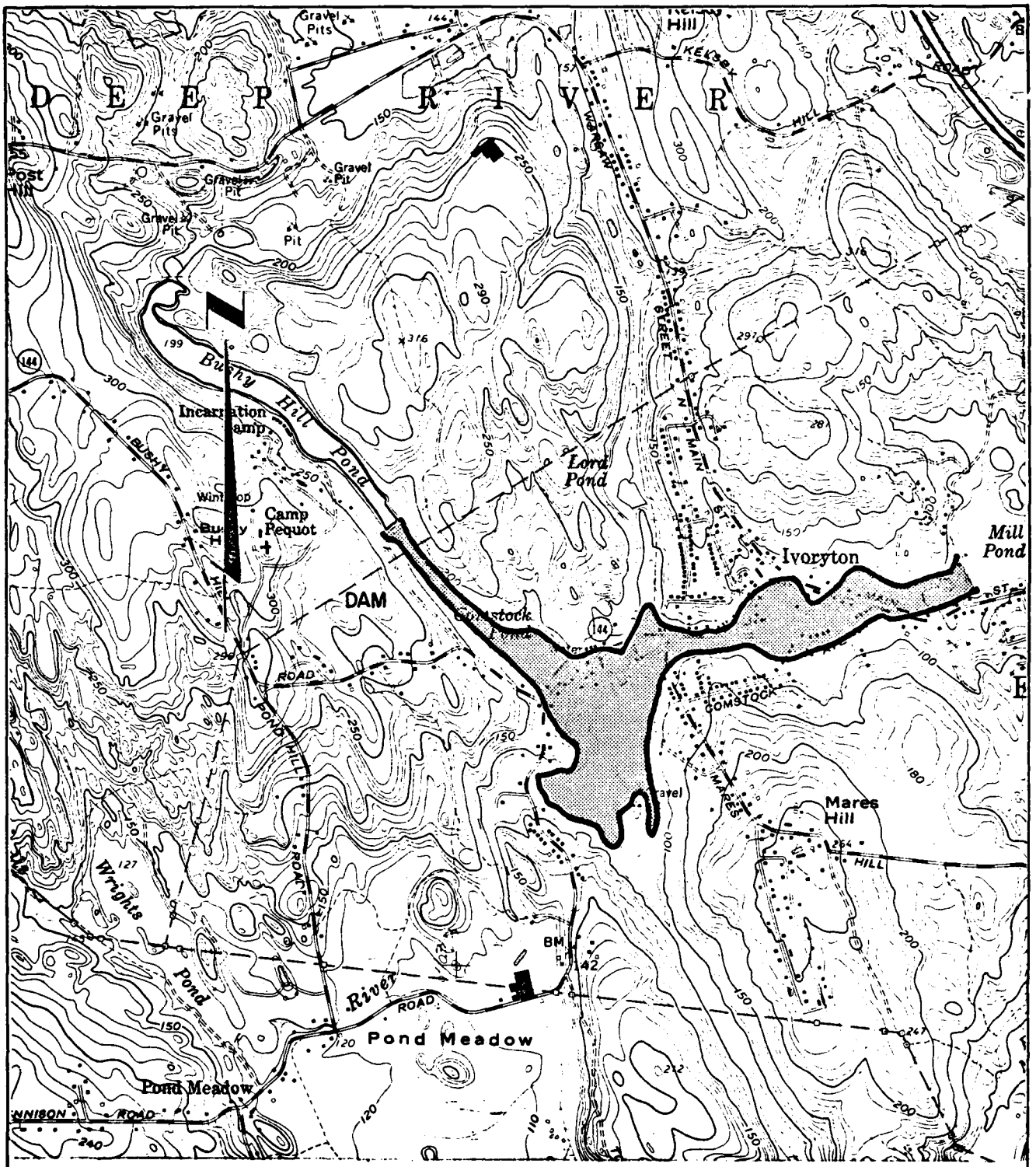

BUSHY HILL POND DAM

DAM FAILURE ANALYSIS

IMPACT AREAS

DEEP RIVER, CONNECTICUT

FLAHERTY • GIAVARA ASSOCIATES, P.C.

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APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTITY NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST.	(7) STATE	(8) COUNTY	(9) CONGR DIST.	(9) NAME	(10) LATITUDE (NORTH)	(11) LONGITUDE (WEST)	(12) REPORT DATE DAY | MO | YR
CT	424	LED	CT	007	02				BUSHY HILL POND DAM	4121.0	7327.6	01APR80

(13) POPULAR NAME	(14) NAME OF IMPOUNDMENT
	BUSHY HILL POND

(15) REGION	(16) BASIN	(17) RIVER OR STREAM	(18) NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	(19) DIST FROM DAM (MI.)	(20) POPULATION
01	08	DEEP RIVER	IVORYTON	1	1500

(21) TYPE OF DAM	(22) YEAR COMPLETED	(23) PURPOSES	(24) STRUCTURAL HEIGHT (FT.)	(25) HYDRAULIC HEIGHT (FT.)	(26) IMPOUNDING CAPACITIES MAXIMUM (ACRE–FT.)	(27) IMPOUNDING CAPACITIES NORMAL (ACRE–FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
RFCBRG	1871	S	29	27	444	530	NED	N	N	N	N	

(28) REMARKS
29=ESTIMATE

(29) D/S HAS	(30) SPILLWAY CREST LENGTH	(31) SPILLWAY TYPE	(32) SPILLWAY WIDTH (FT.)	(33) MAXIMUM DISCHARGE (FT.)	(34) VOLUME OF DAM (CY)	(35) POWER CAPACITY INSTALLED (MW)	(36) POWER CAPACITY PROPOSED (MW)	(37) NAVIGATION LOCKS NO	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
1	245	U	20	139												

(40) OWNER	(41) ENGINEERING BY	(42) CONSTRUCTION BY
CRAIT DEAD AND COMPANY		

(43) REGULATORY AGENCY DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
CONN DEP	CONN DEP	CONN DEP	CONN DEP

(49) INSPECTION BY	(50) INSPECTION DATE DAY | MO | YR	AUTHORITY FOR INSPECTION
FLAHERTY GIAVARA ASSOCIATES	31OCT79	P.L. 92-367

(51) REMARKS

END

FILMED

10-84

DTIC